S
574.52
6323
M26mrb
1990

Aquatic Biology Associates

Bob Wisseman, Senior Scientist
3490 NW Deer Run Road
Corvallis, Oregon 97330
503-752-1568 FAX 503-754-2460

MONTANA STATE LIBRARY
S 574.526323 M26mrb 1990 c.1 Wisseman
Montana rapid bioassessment protocols :b
3 0864 00081216 7

MONTANA

Rapid Bioassessment Protocols.
Benthic Invertebrate Studies 1990

REFERENCE STREAMS PROJECT

PLEASE RETURN

STATE DOCUMENTS COLLECTION

DEC 1992

MONTANA STATE LIBRARY
1515 E. 6th AVE.
HELENA, MONTANA 59620

[illegible]
JAN 9 2002
FEB 12 2002

INTRODUCTION

This report describes the composition and structure of benthic macroinvertebrate communities inhabiting least-impaired reference streams in Montana's six major ecoregions in the summer of 1990. It is portion of a larger project on the "Benchmark Biology of Montana Reference Streams" (Bahls et al. 1991), being conducted by the Montana State Water Quality Bureau. Background information, rationale and objectives of this study are addressed more fully in Bahls et al. (1991).

The general objective of the macroinvertebrate portion of this study was to adapt EPA's Rapid Bioassessment Protocols (RBP) (Plafkin et al. 1989) for gauging pollution severity and progress in abating pollution in lotic waters of Montana.

Figure 1 is reprinted from Plafkin et al. (1989) and illustrates the bioassessment approach that EPA advocates for RBP III. A modified version of the RBP III has been developed here to assess the 1990 Reference Streams macroinvertebrate data.

Figure 2 is a flow-chart of steps taken thus far to adapt the RBP III for use in Montana. This bioassessment protocol relies on the use of minimally impaired "reference" stations or communities to compare against potentially impacted sites. Plafkin et al. (1989) suggest that composite reference communities should be developed in the nations numerous ecoregions (Omernik and Gallant 1986). These composite communities would integrate information from a number of least-impaired sites.

The approach used for the development and selection of appropriate reference values for metrics and composite reference communities for Montana streams is given in figures 1, 2 & 5. Table 1 (reprinted from Bahls et al. 1991) lists all reference streams sampled in 1990. Macroinvertebrate samples were not collected from the two streams in the Wyoming Basin ecoregion.

METHODS

Field

Habitat assessments at each of the candidate reference sites was performed according to procedures outlined by Plafkin et al. (1989). A kick-net with ____mesh was used to collect macroinvertebrate samples from riffles at each monitoring site. Additional kick samples from macrophyte beds were obtained at some sites where this habitat was a dominant type. Samples were preserved in the field with ethanol.

Laboratory

The RBP III recommends field sorting of 100 organisms from kick samples (Plafkin et al. 1989). Kick samples for this study were field preserved and sorted in the lab. Macroinvertebrate kick samples were processed in the following manner:

1. Samples were first cleaned of fine sediment by gently washing on a 500 micron sieve.
2. The entire sample was then floated in water in a shallow white pan and large debris was rinsed and removed.
3. Organic matter plus invertebrates in the pan was repeatedly suspended in water and poured off onto a 500 micron sieve. The mineral material remaining in the pan was searched for snails and stone-cased caddis larvae which did not float off in the washings.
4. Large samples were split using a Jones Riffle Splitter into half or quarter fractions. A fraction containing ca. 300 organisms was then randomly selected for further sorting. The appropriate coefficient was later used to adjust taxa abundances to a full kick sample.
5. Invertebrates were sorted from the sample matrix using a 6X power on dissecting microscopes.
6. Invertebrates were identified to varying taxonomic levels depending on the invertebrate group. The level of taxonomic resolution roughly corresponds to RBP III methodology.

It was decided to modify the EPA RBP III 100 organism field sort, so that a ca. 300 organisms in a kick sample were scope-sorted and identified. Some samples from montane sites contained <300 organisms. Samples from the more productive plains and spring streams often contained invertebrates in the thousands.

DATA ANALYSIS

An outline of the analysis conducted on the Montana Reference Stream macroinvertebrate data is provided in figures 1, 2 and 5.

Standardization of Taxonomic Effort

Invertebrate taxa identified in this study are listed in Appendix 3. In general, the level of identification performed was more detailed than RBP III methodology promotes. This additional taxonomic information will be useful for the study objective designed to address biodiversity.

Invertebrates from a sample were identified, counted and recorded on a bench sheet. After identifications were performed on all samples, the bench sheets were assembled and the total variety of organisms encountered was summarized. For each grouping of taxa, a decision was then made on what level of taxonomic resolution was most appropriate. Emphasis was placed on consistency of identification:

> e.g. How to deal with a mixture of early instar specimens, which cannot be identified to the species or even genus level with certainty, versus late instar individuals which can.
>
> e.g. Larvae and adults of some beetle genera may be present in a sample. Adults of two species may be present and can be identified, while larvae can only be identified to genus. Listing of all taxa identified would yield 3 separate taxa if the adults plus larvae were listed.

In most cases identifications were "bumped up" to a level that would standardize taxonomic effort between samples, and cull out superfluous taxa. A data entry sheet was then made listing the standardized taxa, and the data from the original bench sheet was then transcribed and adjusted accordingly. An example of the data entry sheet is included in Appendix 3.

Further refinement of the standardized level of taxonomic effort is needed. For some of the sites, finer levels of taxonomic resolution were still used in data analysis. In these cases only a single taxa was involved, so the difference would not influence the computation of metrics (e.g. *Gyraulus* used instead of Planorbidae).

The following levels of identification are suggested. Lower levels of identification for selected taxa are listed at the bottom of taxa abundance summaries for each site in Appendix 5.

Miscellaneous, Non-insect Invertebrates

Porifera, Turbellaria, Nematoda, Oligochaeta, Hirudinea, Copepoda, Cladocera, Ostracoda, and Acari were not identified past phyla or class level.

Molluscs: Family for Sphaeriidae, Planorbidae, Lymnaeidae, Ancylidae, Physidae.

Amphipoda, Astacidae, Isopoda (genus, except *Hyallela azteca* to species).

Odonata: Family level is suggested, since damaged or early instar specimens seem to be the rule, rather than the exception.

Ephemeroptera: A finer level of identification for most mayflies is generally possible, though early instar nymphs may cause a problem. Mayfly assemblages may be used in the future as water quality indicators.

Baetidae: Genus for most, and species for *Baetis*. Follow generic limits suggested by McCafferty and Waltz (1990), and hope they come out with descriptions soon.

Genus for Caenidae, Oligoneuridae, Ephemeridae, Leptophlebiidae, Tricorythidae.

Ephemerellidae: Genus for *Attenella, Caudatella* and *Ephemerella*. Species for *Drunella* and *Timpanoga*.

Plecoptera:

Family for Capniidae, Leuctridae and Chloroperlidae (except *Kathroperla*).

Nemouridae: Genus except for *Zapada* to species or species group.

Perlidae: Species except for *Doroneuria*.

Perlodidae, Pteronarcidae, Peltoperlidae to genus.

Hemiptera: Genus, except Corixidae left at family level.

Megaloptera and Lepidoptera: Genus.

Trichoptera: Generally to the genus level.

Rhyacophilidae: Species group or species.

Coleoptera: Pool larvae and adults under a single genus or family name. Elmids to genus.

Diptera:

Blephariceridae, Ceratopogonidae, Culicidae, Dolichopodidae, Ephydridae, Pelecorhynchidae, Simuliidae, Stratiomyiidae, Tabanidae, Tanyderidae generally to family, genus if desired (but be consistent). Pool larval and pupal identifications under one family name.

Athericidae, Empididae, Psychodidae, Tipulidae to genus. Pool larvae and pupae under a single name, or reject misc., unidentifiable pupae.

Chironomidae:

Identify to genus level. Particular taxa (e.g. *Cricotopus Nostococladius*) identify to subgenus or species group.

Data Entry and Computer Programs

Taxa abundance data was entered onto program files developed by Wisseman and VanSickle. A copy of these programs are on disc in Appendix 10. Attributes assigned to specific taxa (e.g. functional feeding group designation, Hilsenhoff Biotic Index tolerance value, etc.) are documented in Appendix 10.

Site Specific Data Analysis

Computer programs analyzed site data in two stages. First, taxa abundances, % contribution of each taxa, subtotals by major taxonomic group, and grand total values were generated (example given in figure 6). Appendix 5 contains this taxa abundance information for each sample. Second, a fortran program computed various metrics and summary statistics for each site. Metrics calculated include all recommended by Plafkin et al. (1989) for the RBP III (example given in figure 7). Appendix 4 contains a complete listing of all metrics calculated for each sample.

Metrics calculated can be summarized as:

Abundance values: Total, EPT, and each major tax. group.
Richness: Total, EPT and each major tax. group.
Ratios of taxonomic group abundances:
    EPT/Chironomidae
    Hydropsychidae/ Total Trichoptera
    Baetidae/Total Ephemeroptera (new program version)
Functional Feeding Group Composition: Number of taxa, abundance, and % contribution of each FFG.
Ratios of FFG abundances:
    Scraper/Collector-filterer
    Scraper/(Scraper + Collector-filterer)
    Shredder/Total organisms
Contribution of 10 dominant: Abundance and % contribution of the 10 dominant taxa.
Saprobic Indices: Hilsenhoff Biotic Index and the CTQa&d of the Biotic Condition Index.
Diversity Indices: Shannon, Evenness, Brillouin, Simpson.
Community Voltinism Analysis: Abundance and % contribution of multivoltine, univoltine and semivoltine taxa. This analysis is preliminary. Voltinism designations need to be refined.
Indicator Assemblages: Not designated for the 1990 reference stream data. The programs developed by Wisseman & VanSickle allow up to 10 assemblages to be easily designated on the template spreadsheet used for data entry.

The summary information provided for each site in Appendices 4 and 5 allows testing of most conceivable new metrics to be made without extensive re-analysis.

Detrended Correspondence Analysis DECORANA:

A central question of this study is: what is an appropriate "regional" classification of stream types in the state of Montana? The RBP III relies on comparison of specific stream sites against a non-impaired reference. Figure 5 outlines the possible types of references which can be used for comparison.

Attempts to compare impaired sites against a single non-impaired reference watershed has generally been found to be unsatisfactory. First, it may be difficult to find watersheds in a region which are non-impaired. Second, this approach assumes that the reference and comparison site are generally matched in habitat structure and have the same potential of invertebrate community development. This assumption is hard to prove and document. Third, regulatory agencies could spend the bulk of their effort searching for and validating appropriate reference watersheds.

Averaging metric values from multiple least-impaired sites from some level of regional grouping of streams has been suggested as a productive alternative to the utilization of single reference sites (Plafkin et al. 1989, Whittier et al. 1988). States could then set water/habitat quality criteria using these average values from regional groupings.

To determine the spatial patterns exhibited by macroinvertebrate communities present in the 1990 Montana reference stream survey, Detrended Correspondence Analysis (DECORANA) was chosen as a multivariate technique to examine patterns. DECORANA is an ordination technique that examines the similarity of sites in species space (Gauch 1982, Hill 1979). DECORANA is considered the superior ordination technique, because it reduces the "arch" effect and the compression of samples near the ends of the first axis.

A DECORANA was run on a matrix listing the raw taxa abundance data from all 1990 Reference Stream riffle samples. Vegetation and pool samples were not included in this analysis. Sites were plotted on the first two axes to determine if any regional patterns in stream character were evident. If there is no correspondence between sites and some level of regional grouping, then we would expect the sites to be randomly scattered in species space.

Results of the DECORANA are provided below in the discussion. However, it will be noted here that the results from the single DECORANA performed on raw taxa abundances with no adjustment for rare species, were conclusive as to regional groupings of sites and adequate enough to define a first generation of regional groupings. Considering; the limited size of the data set (number of sites in each ecoregion sampled), that some sites were obviously impaired, and that 1990 sites represented a range of stream size (small stream to rivers), we did not perform any further data transformations, or try to manipulate the data set in an attempt to get the DECORANA output to conform to ecoregion groupings as defined by Omernik & Gallant (1986).

General results of the DECORANA analysis are outlined here to aid understanding of the next stage of data analysis. Regional groupings defined were:

> MONTANE: Rocky Mountain sites exhibited a relatively tight clustering of sites in species space, except for Wisconsin Creek.
>
> PLAINS: Sites from all three plains ecoregions in Montana, exhibited a tight clustering in species space, except for the Tongue River site.
>
> SPRINGS: Invertebrate communities from Valley and Foothill Prairie SPRING Streams were loosely associated with MONTANE sites. However, sites were scattered in species space, indicating a relatively weak similarity between communities.

Derivation of Reference Metric Values (Single Site Descriptor Metrics):

A matrix of metric values for each of the above three regional groupings of streams was constructed. Average metric values and their variability were then calculated. Measures of variation included standard deviation and the range.

These average metric values for reference streams in each region are then used in the RBP III for making comparisons (figure 1).

Derivation of Composite Reference Communities for calculation of Similarity Indices:

The use of community similarity indices has been incorporated into several macroinvertebrate bioassessment protocols (Plafkin et al. 1989, Shackleford 1988). A reference community is necessary to compare impacted sites of interest against.

A composite reference community was derived for the MONTANE, PLAINS and SPRING site groupings of the 1990 Montana reference streams. These composite communities were derived in the following manner.

1. For each "region", i.e. MONTANE, PLAINS or SPRINGS, a matrix of all raw taxa abundances was constructed for all riffle samples from all sites in the region. Vegetation and pool samples were not included. The Tongue River in

the PLAINS region was considered atypical and rejected, as was Wisconsin Creek in the MONTANE region.

2. Average abundances were then derived for the entire regional data set for each taxa .

3. Taxa were then ranked by average abundance, from most abundant in the region to least.

4. The resulting composite lists of taxa for all streams in a region varied from 100 to over 200 taxa present. In order to obtain more realistic comparisons using similarity indices between specific sites and the composite reference community, the composite community was limited to the number of most dominant taxa equivalent to the mean number of taxa (total taxa richness) found in streams in that region. Average total richness for MONTANE streams was 34, PLAINS, 29, and SPRINGS, 34.

5. Average taxa abundances for each region were then run through the metric programs developed by Wisseman and VanSickle to produce an ASCII file. A FORTRAN subroutine of the metric programs can then compare any two ASCII files (e.g. composite reference community versus any single site), and calculate a variety of similarity indices.

Derivation of Average Similarity Index Values for Reference Streams in each Region:

Similarity indices were calculated for all 1990 Reference Stream sites by comparing specific sites with the composite reference community derived in the above step of data analysis. Printouts of all these comparisons are provided in Appendix 6 (figure 8 is an example).

A matrix for each region was then constructed that listed all (specific reference stream) X (composite reference community) similarity index values. Average index values and their variability were then calculated. Average values were then used for comparisons in the RBP III (figure 1).

Metric Selection:

From the possible field of metrics useful for evaluating water/habitat quality, a list of first generation metrics for use in Montana was selected. In the absence of a database from Montana or Northwest streams which exhibit a range of habitat or water quality impairment to correlate individual metrics against and determine sensitivity, first generation metric selection was accomplished using the following criteria:

1. Has the metric had historical use as a water quality indicator?

2. Is the variability of the metric relatively low among reference or least impaired streams in the regional groupings?

3. Is the metric applicable in a high number of the reference streams in a region? Some of the ratios that been advocated have a high number of "0" or undefined values in some regions.

4. Metric selection will attempt to incorporate as many classes of community descriptors as possible...e.g. metrics based on richness, taxonomic composition, functional feeding group composition, diversity/dominance, saprobic indices, etc.

Habitat Assessment:

A habitat assessment protocol as outlined in Plafkin et al. (1989) was conducted at each reference stream site along with the macroinvertebrate sampling by state of Montana Water Quality Personnel (figure 9 is an example).

A template spreadsheet and graph file in Quattro Pro was constructed to enter site data, calculate total habitat assessment scores, and graph results. These files have been constructed so subsequent years trend data can be entered and tabular and graphical summaries will be automatically updated (example given in figure 10).

Tabular summaries of scores of individual habitat parameters and the total habitat assessment scores were prepared for each region.

Habitat Summary:

Auxiliary habitat and water quality information was collected during the 1990 Reference Stream survey. Field data sheets were adapted from Plafkin et al. (1989)(figure 11 is an example).

A template spreadsheet file in Quattro Pro was constructed to enter the field-collected information. This file is designed so that subsequent years information can be added easily. Formula for quantitative parameters can be entered later to derive averages, etc. (figure 12 provides an example). Hard copies of all site files are provided in Appendix 8.

Metric Scoring and Final Bioassessment Scoring Criteria:

Scoring criteria for the RBP III analysis (figure 1) was adapted directly from Plafkin et al. (1989) and Shackleford (1988), with some adjustments.

These scoring criteria have been used for illustration purposes only. Aquatic Biology Associates does not presume that it can set state standards.

Correlation between Macroinvertebrate Community Metrics and Total Habitat Assessment Scores:

Graphical summaries were prepared that plot the Total Habitat Assessment Score against selected invertebrate community metric values to see if correlation are evident.

Riffle vs. Vegetation Samples:

Macrophyte beds were often common habitat types in PLAINS and SPRING streams. Particularly in lower gradient PLAINS streams, true riffles may be rare and unrepresentative of habitats present. In addition to riffle kick-net samples taken at several PLAINS sites surveyed in 1990, kick-net samples were also acquired in macrophyte beds (vegetation samples), and at one site a pool was sampled. At 3 SPRINGS sites, riffle and vegetation samples were taken.

These additional habitat samples were analyzed in the same manner as the riffle samples. They were not used in any of the above data analysis. Tabular summaries comparing selected invertebrate community metrics derived from riffle vs. vegetation samples were prepared, to highlight major differences.

Effect of Subsample Size:

A preliminary test of the effect of subsample size on RBP III metrics was conducted by analyzing separately 2 fractions of 9 different kick samples (i.e. doubling the number of organisms sorted).

RBP II Analysis:

A preliminary test of a modified RBP II protocol was conducted on 15 1990 Reference Stream sites. The RBP II represents a reduced level of taxonomic effort. These results have not been summarized. Appendix 9 contains the print-outs taxa abundance and metric summary print-outs for these samples.

Comparison of Replicate Kick Samples:

At 4 Reference Stream sites, an additional kick sample was taken in a riffle habitat to conduct a preliminary assessment on variability between replicate samples. Selected metrics have been summarized for these paired samples for comparison. It is not possible to directly "test" for a difference in metric values between replicates A & B, because the two are randomly selected; replicate A at one site has nothing in common with replicate A at any other site.

From a sampling standpoint, the above problem must be restated: How much variation is there between replicates within a site, relative to the variation between sites? If between-replicate variation is large, relative to between site variation, then at least two important conclusions can be drawn:

1. Many replicate samples will be required to get a precise estimate of a metric mean value at a site, and to detect small, but real, differences between mean metric values at 2 or more sites.

2. If within-site variation is large, then small, but statistically significant differences between means at two or more sites probably have no ecological significance.

Thus the question of within site versus between site variability is quite important and should be further explored.

Test Case:

After the development of the first generation of Composite Reference Communities, average Reference Metric Values, and scoring criteria, the modified RBP III was tested on 5 Demonstration Project streams sampled in Montana in 1989 and 1990. Full documentation of this test case is provided in Wisseman (1992).

RESULTS AND DISCUSSION

The 1990 Reference Stream survey sampled 36 sites throughout Montana. Sites which were considered to be least-impaired by human activities were selected, though virtually all sites were considered to be impacted to some degree. Sites were located in 6 ecoregions as defined by Omernik and Gallant (1986) (Table 1).

Invertebrate identification and data analysis was conducted by Aquatic Biology Associates of Corvallis, Oregon. Site selection, sampling, and habitat assessments were performed by Montana Water Quality Bureau personnel.

The overall objective of the Reference Stream Project was to adapt EPA's Rapid Bioassessment Protocol III (RBP III) for evaluating the biotic integrity of benthic invertebrate communities in Montana streams (figure 1). Figures 2 and 5 are flow-chart summaries of our approach to meeting this objective.

Full documentation of results are provided as follows:

Synthesis Report: Text and summary figures and tables.
Appendix 2: Documentation for DECORANA analysis.
Appendix 3: Taxa list, data entry sheet.
Appendix 4: Listing of all metrics calculated for each site.
Appendix 5: Taxa abundance data listing and summary information for each site.
Appendix 6: Similarity indices from dual site comparisons between Composite Reference Communities and individual sites.
Appendix 7: Habitat Assessment for each site.
Appendix 8: Habitat Summaries for each site.
Appendix 9: Results of RBP II test run.
Appendix 10: Metric programs and documentation. Disc files of all analysis and reports.
Test Case: The 1992 report by Wisseman on the Montana Demonstration Projects is a test case for the modified RBP III developed here.

General Site Information:

In the montane ecoregions, a range of stream sizes were sampled, from small, densely forested headwater streams to rivers, with more open channels. Sites spanned a considerable range in elevation, and were located in watersheds of varying bedrock geology and soils.

In the 3 plains ecoregions, a total of 11 sites were sampled. Most of these watersheds have experienced intensive agricultural and ranching activities for decades, and thus have been moderately to severely impacted. Sites were chosen that were considered to be "least-impaired". Because of the paucity of lotic waters in some of the plains ecoregions, sites chosen were often the only ones available. With the exception of the Tongue River, most plains sites sampled in the summer 1990 were barely flowing. Extended drought conditions have prevailed in the plains ecoregions for over a decade.

In the Montana Valley and Foothill Prairies (MVFP) region, 7 streams (including Big Otter at Bodmers from the Demonstration Projects) were sampled. These streams can be classified as "Spring" streams, since they arise from large spring-heads in the foothills. Spring-head reaches of these watersheds have more constant temperature, cool water conditions. Gravel and cobble substrates dominate, and macrophyte beds can often be found in profusion. Invertebrate standing crop and presumably production is high.

Regional Grouping of Montana Reference Streams:

DECORANA analysis (Gauch 1982, Hill 1979) was performed on a matrix containing raw taxa abundance of all taxa from all riffle samples taken at the Reference Stream sites. This type of multivariate analysis was felt to be the most appropriate for determining if regional groupings were evident. Figures 13, 14, and 15 plot sites on the first two ordination axes. Appendix 2 provides a full print-out of the DECORANA results.

Only the first two axes have been used in this analysis, since most of the meaningful variability is accounted for by the first few ordination axes (Gauch 1982). Eigenvalues (variance accounted for by the axis) for the site ordination, were 0.897 for axis 1 and 0.565 for axis 2. These are high values, but see the discussion by Gauch (1982).

Site code names that have been plotted in figure 13, have been converted to letters representing the different ecoregions and subregions of Montana in which the sites were located.

All plains streams, with the exception of the Tongue River site, are found to cluster tightly (figure 14). The Tongue River is exceptional, because it was the only plains site sampled which had any significant discharge (ca. 800 cfs), while the remaining plains streams were barely flowing. The Tongue River benthic invertebrate community was as closely related to montane streams as it was to the other plains streams.

Montane streams had a relatively tight grouping on axis 1, but were spread on axis 2. Wisconsin Creek was an outlier. This is small, heavily forest montane stream, while the remaining montane streams sampled were mostly mid- to large size streams with more open canopy.

Montana Valley and Foothill Prairie (MVFP) Spring Streams were scattered in species space, indicating that benthic invertebrate communities in these streams are not highly similar.

The sites are replotted in figure 15 to highlight MONTANE, PLAINS and SPRING stream groupings. Axis 1 produces a strong division between plains and montane streams. Axis 2 appears to be related to discharge, with montane sites appearing to roughly ordinate along a gradient of increasing discharge. We have no discharge data to corroborate this observation with, however.

For the first generation of the RBP III for use in Montana, we suggest that Regional Reference Communities and Metric Values be developed for 3 "regions"; MONTANE, PLAINS, and with some reservation MVFP SPRING streams.

We halted multivariate analysis of the 1990 Montana Reference Stream data set at this point for several reasons. First, the results from the first DECORANA analysis produced significant results and allowed a first generation regional grouping to be made. Second, we do not feel that the 1990 data set is robust enough to warrant continued manipulation of the data set in an attempt to further subdivide the groupings. The sample size taken from each ecoregion and major habitat type (e.g. small, medium and large streams) is too small, and may lead to artificial divisions of dubious value.

In this study of least-impaired streams from 6 Montana ecoregions and in a similar study conducted on least-impaired streams in 8 Oregon ecoregions (Whittier et al. 1988), the most appropriate initial partitioning of macroinvertebrate communities present in running waters was into montane versus valley and basin streams. Though fish and periphyton communities displayed some tendency towards ecoregion groupings in the Oregon study, lotic invertebrate communities in western North America simply do not seem to cluster into ecoregion groupings as defined by Omernik and Gallant (1986).

Lotic invertebrate communities in mid- to large size streams of the humid coniferous forest biome in mountainous areas of western North America (Figure 3) may eventually be found to have a high degree of similarity. Communities present in lotic waters of basins in western North America (Figure 4) may be more dissimilar.

It may be found more productive to further divide the MONTANE and PLAINS regions according to size of the system (small, medium, large streams and riverine), rather than into smaller regional units. Since the purpose in deriving Regional Comparison Values is more for initial site screening (figure 5), there will come a point in the regional subdivision process of diminishing utility.

Both this study of Montana Reference Streams and that of Whittier et al. (1988) for Oregon, selected least-impaired streams in the "most typical" portions of their respective ecoregions (see Omernik & Gallant 1986).

> For example, in montane ecoregions, only mid- to higher elevation streams that were encompassed entirely by coniferous forest were included in the analysis, while streams originating or passing through more xeric low elevation sites in the ecoregion were excluded.

For the basin and valley ecoregions in the Oregon and ? for the Montana study, the vast majority of the lotic waters to be found in the entire ecoregion were rejected from the analysis because they did not originate in and were not totally encompassed by the "most typical" areas of the region (basin/ valley bottom). Most intermontane basins in western North America are xeric, and most water that flows through them is derived in montane regions bordering these basins.

Streams that originate in, or flow through the transition or border areas of the ecoregions ("generally typical" areas as defined by Omernik & Gallant 1986), are left out of this analysis. In the Montana study presented here, some Valley and Foothill Prairie Streams have been included in the analysis that are located in transition areas between montane and basin/plains ecoregions, but these streams are atypical, in that they originate in large volume springs. Besides the MONTANE, PLAINS and SPRINGS (a special case) regions, another basic region may need definition, which can be called FOOTHILLS.

The Fauna:

Dominant invertebrate taxa found during the 1990 Reference Stream survey are ranked in Tables 2 & 3 for the MONTANE, PLAINS and SPRINGS streams.

Mayflies, stoneflies and caddisflies (EPT) dominated MONTANE stream communities, having a 58, 11.4 and 13.6 % contribution, respectfully. The first 6 dominant taxa were mayflies. *Baetis tricaudatus*, a ubiquitous and relatively tolerant taxa to pollution, was dominant. Remaining dominant taxa were a mixture of highly intolerant to moderately tolerant forms. Chironomid midges averaged 9.1 % of the MONTANE community. Seven midge genera per stream was the average. Non-insect (Misc.) taxa contribution was low (1.7%), and averaged only 2 taxa present at each site. Odonata, Hemiptera, Megaloptera and Lepidoptera were absent.

PLAINS streams benthic invertebrate communities contrasted sharply with MONTANE streams (Tables 2 & 5). Non-insects, chironomid midges, mayflies, and other dipterans were the most abundant groups present. *Physella*, a highly tolerant snail, was the dominant taxa found. Most of the dominant taxa present can be classed as highly tolerant of, pollution (e.g. nutrient enrichment), high temperatures, depressed dissolved oxygen, and fine sediments.

The benthic invertebrate community of the Tongue River PLAINS site was decidedly different from the other plains streams sampled. This site carries a high volume of water and has coarser substrates. This site may support a community that is as close to primeval conditions for Montana PLAINS streams as any other site surveyed in 1990.

The invertebrate composition of SPRING streams was more highly variable (Table 6). On average, caddisflies accounted for 33.1 % of the fauna, chironomids (18.3 %), beetles (15.1 %), mayflies (14.8 %), other dipterans (3.3 %) and stoneflies (1.2 %). Caddisflies, particularly *Lepidostoma* and *Brachycentrus*, were often present in great abundance (Table 3). Though the kick samples taken were qualitative, a mean abundance of 2329 organisms present in the SPRINGS samples versus 548 in the MONTANE samples, indicates that these spring streams are very productive systems.

Metric selection for RBP III Analysis:

Metric summaries from all sites are presented in Tables 4-6. Metrics calculated include those advocated by Plafkin et al. (1989), Shackleford (1988), plus others. Criteria used for metric selection has been reviewed above.

Individual metrics may be positively or inversely related to water/habitat quality, e.g. EPT Richness is positively related since values increase as water/habitat quality increases, while the Hilsenhoff Biotic Index is inversely related since values increase as water/habitat quality decreases.

A first generation set of metrics has been selected for the MONTANE, PLAINS and SPRINGS regions (Tables 7-12). These should be subjected to intensive evaluation as more data sets become available. In particular, they should be correlated with robust measures of water/habitat quality from streams exhibiting a wide range of impairment.

Metrics based on ratios, e.g. taxonomic or functional feeding group ratios, were in general highly variable. Ratios are the combination of two separate metrics. They incorporate and compound the variability displayed by the numerator and denominator components. Zero and undefined values can often appear. In most cases it is probably better to use the straight % contribution of the water quality indicator component of the ratio...e.g. % Collector-filterer, % Scraper, or % Chironomidae.

Both richness metrics suggested by Plafkin et al. (1989), Total and EPT, have been selected for MONTANE, PLAINS and SPRINGS regions.

Metrics based on functional feeding group composition are % Collector-gatherer and % Scraper. The former is inversely related to water/habitat quality, while the latter is positively related. This metric was not used in the PLAINS region, because of a paucity of scrapers.

Metrics incorporating Collector-filterer (CF) abundances were found to be variable and not interpretable. Collector-filterer based metrics, whether straight % contribution, or in ratios, may be better suited for riverine habitats or foothill streams.

Two measures of diversity were selected, % Dominant Taxa and the Brillouin Diversity Index (Brillouin H). The Hilsenhoff Biotic Index, a saprobic index, was included, as was the % contribution of Multivoltine taxa.

Among the various similarity indices available, 4 were selected. The Community Loss Index suggested by Plafkin et al. (1989) has been tentatively included, although it did not seem as responsive as the Quantitative Similarity Index for Taxa proposed for usage by Shackleford (1988). Tables 13-15 summarize some of the similarity indices calculated when individual Reference Streams surveyed in 1990, were compared with the Composite Reference Community. Averages and variation for the MONTANE, PLAINS and SPRINGS regions are provided.

The current RBP III metrics that examine the taxonomic composition of the community, are ones that utilize order or family level identifications...e.g. EPT/Chironomidae (Plafkin et al. 1989). Higher levels of taxonomic resolution were purposefully used so that there would be broad applicability across North America. We found that among the Montana Reference Streams surveyed in 1990, that most of these taxonomic based metrics, particularly ratios, were highly variable. Their sensitivity as water/habitat quality indicators is probably low.

When the RBP III is adapted on a regional basis, there is an opportunity to incorporate taxonomic based metrics that include genus or even species level identifications. This approach has been widely used in England and Europe (Hellawell 1986). Individual taxa or assemblages of taxa that are ubiquitous within a region, and are strongly correlated with water quality, have been extensively used to monitor water quality.

It is recommended that Indicator Assemblages (IA's) be developed for use in Montana. An example for MONTANE and SPRING streams using mayflies would be to divide dominant mayflies present in these regions into 2 or 3 assemblages:

Assemblage A= **highly tolerant taxa** such as *Callibaetis, Centroptilum, Caenis, Timpanoga, Stenonema and Tricorythodes*, etc.

Assemblage B= **moderately tolerant** taxa such as *Baetis, Acentrella, Diphetor, Ephemerella inermis, Epeorus albertae, Serratella tibialis, Cinygmula, Nixe, Heptagenia, and Rhithrogena*, etc.

Assemblage C= **intolerant taxa** such as *Caudatella spp., most Drunella spp., most Epeorus spp.*, etc.

The metrics derived from these IA's could be based on simple comparisons of % contribution of each assemblage. IA's within other major taxonomic groups, e.g. the Trichoptera and Chironomidae, could be constructed. IA's may be very powerful water/habitat assessment metrics, that would be applicable at all levels of Reference vs. specific site comparisons (figure 5).

Monitoring of specific taxa, or specialized assemblages of taxa, could be incorporated for trend monitoring or when upstream controls are used (figure 5).

Further discussion of specific metrics that have been selected or which may prove to be useful in RBP III analysis is provided below:

TAXA RICHNESS METRICS

TOTAL TAXA RICHNESS:

This metric is the total number of distinct taxa that have been identified from a site. There is generally a direct association between total richness and water quality...i.e. as water quality declines in a stream, so does taxa richness and vice versa. This metric must be interpreted with caution, however.

Slight or moderate enrichment of water bodies can lead to an increase in taxa richness, as more pollution tolerant forms also appear along with the usual compliment of more intolerant taxa. Further enrichment will eventually cause most intolerant forms to disappear.

Another example of when total taxa richness may increase somewhat in the face of declining water quality, is along a longitudinal gradient. Sites lower in a watershed may have communities which have large compliments of both headwater and riverine taxa, resulting in an overall greater taxa richness, even though habitat and water quality declines in an upstream to downstream direction. This may be the case for slight impairment of habitat/water quality. Moderate or severe impairment usually accelerates the extinction of headwater fauna along a longitudinal gradient, and impoverishes riverine taxa.

Average total taxa richness found during the 1990 Montana Reference streams survey, was: MONTANE= 34, PLAINS= 29, and SPRINGS= 34.

EPT RICHNESS:

Ephemeroptera+Plecoptera+Trichoptera (Mayflies + Stoneflies + Caddisflies) are orders of aquatic insects. Mayflies and caddisflies can be found in a wide range of aquatic habitats. Stoneflies are generally restricted to cooler, cleaner, running water. Individual EPT taxa display a range of pollution tolerance. However, in most healthy running water habitats, a large proportion of the total taxa richness is made up of these three orders.

Average EPT Richness for Montana Valley and Foothill Prairie Spring Streams is 16 taxa, Montane= 22, Plains= 6.

TAXONOMIC COMPOSITION METRICS

BAETIDAE/EPHEMEROPTERA RATIO:

Baetid mayflies are generally considered to be more pollution tolerant than most other mayfly taxa found in montane streams. Values for this ratio can range from 0-1. The higher the value, the more the mayfly community is dominated by baetids. High values may indicate impairment of habitat/water quality. This metric has not been extensively evaluated.

Average Montana Reference Stream values are: Montane= 0.2, Plains= 0.33, Valley and Foothill Prairie Spring Streams= 0.45. It appears that high baetid densities are typical for the Spring streams.

HYDROSYCHIDAE/TRICHOPTERA RATIO:

This metric operates in a similar manner to the Baetid/Eph. one described above. Hydropsychid caddisflies are generally pollution tolerant taxa. These net spinning, filtering caddisflies can attain remarkable densities in running waters that are slightly to moderately enriched. Habitat is a limiting factor for these caddisflies, since they require relatively stable large mineral substrates or macrophytes to attach nets.

Average values for Montana Reference streams, are: Montane= 0, Plains= 0.43, and Valley and Foothill Prairie Spring Streams= 0.22. This metric was found to be highly variable.

% CHIRONOMIDAE:

Increased dominance by chironomid midges as compared to reference communities or control stations, generally indicates impairment. Water bodies severely stressed by pollution (enrichment, sediment or toxins) are often dominated by this family of true flies.

The family chironomidae has been highly successful at inhabiting and diversifying in freshwater habitats. Diverse assemblages of species can be found in all but the most severely polluted water bodies. Thus, high midge taxa diversity and moderate numbers are expected in most running waters.

Least impacted Montane Reference Streams in Montana were found to average 7 midge genera and have the midges contribute 9.1 % to the total abundance. Least impacted Montana Valley and Foothill Prairie Spring Streams averaged 18.3 % chironomids in 9 genera, while Montana Plains streams (most moderately or severely impacted) were 22.5 % midges in 9 genera.

FEEDING GROUP METRICS

% COLLECTOR-GATHERER:

Members of the Collector-gatherer (CG) functional feeding group feed on fine sediment that is enriched with particles of organic matter. The proportion of the total invertebrate community composed of collector-gatherers can be a useful habitat/water quality indicator, particularly for trend monitoring. If CG's are increasing at a site, a negative trend in habitat/water quality is indicated.

Collector-gatherers generally increase in dominance along a longitudinal gradient in running water systems, i.e. increase in dominance in a downstream direction. There is also an inverse relation with stream gradient, e.g. as stream gradient lowers, fine sediment settles in backwaters, and CG numbers increase. Slight or moderate nutrient enrichment can cause CG numbers to increase greatly in moderate or low gradient streams.

Collector-gatherers were found to be dominant in most Montana Reference streams surveyed in 1990. They were felt to be a better habitat/water quality indicator than Collector-filterers.

% SCRAPER:

The Scraper feeding group acquires its food by grazing periphyton off hard surfaces found on the bottom of streams. A diverse and numerically well represented Scraper community is felt to reflect good habitat/water quality.

Nutrient enrichment usually inhibits scraper community development, as diatom dominated periphyton communities are replaced by unpalatable filamentous algae and bacteria mats.

High amounts of fine sediments can settle on hard surfaces during periods of low to moderate discharge, smothering periphyton and inhibiting Scrapers.

Excessive scouring of streambed substrates by high amounts of silt and sand transported during storm or meltwater events can also have a negative effect on the periphyton community, and thus on the Scrapers.

Average Scraper % contribution found during the 1990 Montana Reference Stream survey, was: Montane= 36.2, Plains= 6.3, and Valley and Foothill Prairie Spring Streams= 24.4.

% SHREDDER:

The Shredder feeding group consumes large particles of detritus such as leaves, needles and wood. Most montane streams with a healthy riparian vegetation community and sufficient instream structure to retain detritus long enough for conditioning and processing, will have a number Shredder taxa. Small, forested montane streams often have benthic communities dominated by this group.

In running waters, there are several trends in Shredder % contribution and taxa diversity. First, Shredders numbers are usually higher in headwater streams. Second, they are typically more abundant in forested versus xeric watersheds. Third, they are more common where there is sufficient substrate roughness to entrain detritus, or in-stream structures such as boulders and logs which create debris jams or backwaters where detritus can accumulate.

Shredder abundance and diversity generally increases with increasing habitat/water quality. Channelized or sluiced out streams tend to have poor Shredder numbers/diversity, since detritus is not retained for a sufficient period for life cycles to be completed. Fine sediment can smother detritus accumulations, leading to anaerobic conditions. High nutrient enrichment can cause an unpalatable flora to develop on detrital surfaces (e.g. bacterial mats).

Average shredder % contribution found during the 1990 Montana Reference Stream survey, was: Montane= 8.4 %, Plains= 0 %, and Valley and Foothill Prairie Spring Streams= 6%. These were kick samples taken in riffles, and not pool or margin samples, where Shredder dominance is expected to be greater.

SCRAPER/(SCRAPER+COLLECTOR-FILTERER) RATIO:

This metric is a ratio of a feeding group generally indicative of high habitat/water quality (Scraper) to a group indicative of lower quality (Collector-Filterer). Higher values indicate increasing dominance by the Scrapers.

This metric has proven to be highly variable when applied to data from Montana Reference streams. It may be more useful for trend analysis at selected streams, than for general survey protocols.

Average values for Montana Reference streams, are: Montane= 0.9, Plains= 0.2, and Valley and Foothill Prairie Spring Streams= 0.6.

MEASURES OF DIVERSITY

% DOMINANT TAXA:

This metric is simply the % contribution of the most numerous taxa found in a community. It is a simple measure of diversity. Plafkin et al. have suggested that the numerically dominant taxa in minimally impacted streams should comprise <20% of the community. An evaluation of Montana Reference streams conducted in 1990, suggest that this figure should be elevated to ca. <30%.

In general, the more stressed an aquatic ecosystem is, the greater the tendency is for the % Dominant Taxa to rise. Severely stressed communities may be composed of >90% of a single taxa.

Average values found during the 1990 Montana Reference Stream survey, are: Montane= 28.9, Plains= 34.8, and Valley and Foothill Prairie Spring Streams= 35.2.

It is suggested that the high average value for the Spring streams, is more reflective of the more stable nature of these systems...i.e. they are not subject to great disturbance from spates. This may allow certain taxa, which find conditions in these springs to be favorable, to become extremely numerous.

The Plains Streams probably have a high average % Dominant taxa, because most of these systems are stressed from non-point source pollution, and carry high fine sediment loads.

BRILLOUIN INDEX:

The Brillouin Index is a Diversity Index based on information theory. Other indices of this nature include the Shannon, Simpson, McIntosh, etc. Explanations of these indices can be found in most ecological textbooks, and will not be covered here.

The greater the index number the more "diverse" the community is. In this context "diversity" should not be equated with taxa richness. In general, increasing habitat/water quality leads to higher Index values.

Average Brillouin H Index values found for Montana Reference streams, are: Montane= 2.43, Plains= 2.2, and Valley and Foothill Prairie Spring Streams= 2.33.

SAPROBIC INDICES

HILSENHOFF BIOTIC INDEX:

The Hilsenhoff Biotic Index was originally designed to indicate degree of organic enrichment to running water bodies. It is also believed to be a good indicator of nutrient enrichment. Values range from 0-10, with 0 indicating a community composed entirely of taxa extremely intolerant to nutrient enrichment, and 10 indicating sewage lagoon conditions.

Several trends in HBI values should be pointed out. First, even in pristine systems, HBI values will generally increase along a longitudinal gradient, from headwater streams to riverine reaches. This reflects a natural deposition/accumulation of nutrients in downstream, lower gradient habitats. Second, xeric, more open streams generally have higher HBI values than forested streams. This is because increased stream temperatures and sunlight lead to greater autotrophic production. Decaying algae and macrophytes can cause natural enrichment of the stream.

Average HBI values for Montana Reference Streams, are: Montane= 2.5, Plains= 7.0, and Valley and Foothill Prairie Spring Streams= 3.8.

% MULTIVOLTINE:

This metric calculates the percentage of the community which has more than one generation a year. Stressed ecosystems tend to become dominated by fast-growing "weedy" taxa. Thus, the higher the % Multivoltine value is in relation to a reference community, the greater the likelihood that a water body is stressed or impaired.

Average values for Montana Reference streams, are: Montane= 19.3, Plains= 24.7, and Valley and Foothill Prairie Spring Streams= 23.2.

COMMUNITY SIMILARITY INDICES

COMMUNITY LOSS INDEX (CLI):

This index measures the loss of benthic taxa between a reference station and a comparison station. It is an index of community dissimilarity, with values increasing as the degree of dissimilarity increases. Values range from 0 to infinity.

QUANTITATIVE SIMILARITY INDEX FOR TAXA (QSI-taxa):

This index compares the similarity of two communities, both in terms of taxa present (qualitative) and their relative abundance (quantitative). Values for this index range from 0-1, with identical communities having a value of 1 and totally dissimilar communities having a value of 0. This index appeared to be more sensitive in indicating possible impairment than the QLI described above.

QUANTITATIVE SIMILARITY INDEX FOR FUNCTIONAL FEEDING GROUPS (QSI-FFG).
This index applies the same equation for the QSI-taxa, to the relative abundance of functional feeding groups.

DOMINANTS IN COMMON (DIC-5):
The index compares the list of 5 most dominant taxa from the Reference Community and the comparison site, and determines how many of those taxa are shared in common. The more similar two communities are, the more dominant taxa they will have in common.

Habitat Assessment:

Tables 16-18 are summaries of the Habitat Assessment (HA) Protocol conducted at each Reference Stream site in 1990 (modified from Plafkin et al. 1990). Figures 16-20 plot invertebrate community metrics against Total HA Score to see if there is a correlation between this score and metrics selected for their water/habitat quality value.

Since this analysis only included the Reference Streams, which were considered to be least-impaired, a full range of possible HA and invertebrate community metric values is not represented. All correlations between Total HA scores and invertebrate community metrics is poor. If habitat is a strong determinate of community structure, then we can conclude that, either: 1. The HA is insensitive as a predictor of invertebrate community structure; or 2. all invertebrate community metrics are insensitive as habitat quality indicators; or 3. both are insensitive.

Habitat is certainly a strong determinate of community composition and structure (Southwood 1977). It is difficult to believe conclusion 2, that all of the invertebrate community metrics plotted in figures 16-20 would be insensitive as indicators of habitat quality. Conclusion 3 is a possibility. Conclusion 1, that the Habitat Assessment Protocol (Plafkin et al. 1989) is not a sensitive predictor of invertebrate community structure is the most likely.

We feel that the Habitat Assessment Protocol as currently proposed as an adjunct to the RBP III, needs an overhaul. The current HA examines in-stream and riparian characteristics of a particular study reach (i.e. on the order of 100 m in length). Lotic waters are unidirectional systems. The invertebrate community present at any point in the system is greatly influenced by uphill abiotic and biotic factors. Habitat assessments should include some evaluation of impacts occurring in the watershed above a monitoring station.

Vegetation Samples:

Macrophyte beds were often common habitat types in PLAINS and SPRING streams. Particularly in lower gradient PLAINS streams, true riffles may be rare and unrepresentative of habitats present. In addition to riffle kick-net samples, at several PLAINS sites surveyed in 1990, kick-net samples were also acquired in macrophyte beds (vegetation samples), and at one site a pool was sampled. At 3 SPRINGS sites, riffle and vegetation samples were taken.

Should the RBP III focus on the dominant habitat type present, or restrict its usage to riffle/runs only? The purpose of the extra vegetation/pool samples taken at Reference Streams in 1990, was to explore this question.

Tables 19 and 20 list selected invertebrate community metrics for riffle and vegetation/pool samples. At all but one site, total and EPT richness was substantially lower in the vegetation samples. The proportion of non-insect (misc.) taxa was higher in vegetation samples. This was due to high numbers of snails and amphipods in most cases found on vegetation.

There were substantial differences in most metrics of most sample pairs. A more rigorous experimental design is needed to modify the RB Protocol III to accommodate anything other than riffle/run samples. The macrophyte/vegetation type sample would have to be better defined and sampled consistently at all available sites to conduct a full analysis of its potential. Regional Reference Metric Values and Composite Regional Communities would have to be set up separately from the riffle samples.

Metric Variation between Replicate Kick Samples:

From label information, Aquatic Biology Associates has assumed that at 4 of the 1990 Reference Stream sites, that a pair of kick samples was taken in riffle/run habitats. We presume that this was done to obtain an idea of within site sample variation using the kick-net method. If this is wrong, then this section can be disregarded. These samples were processed and analyzed independently. Results for selected invertebrate community metrics are presented in Table 21.

From a preliminary analysis of replicate kick samples, variation in metric values is high. This indicates refinement in sampling technique is called for. Aquatic Biology Associates can make some suggestions.

Effect of Subsample Size on RBP III Metrics:

A preliminary test of the effect of subsample size on metric values was conducted on 9 of the 1990 Reference Stream kick samples. Selected metrics for subsample A and subsample A+B (a doubling of the fraction sorted and identified) are listed in Table 22.

Total adjusted invertebrate abundance estimates for all 9 samples were within 5% of each other, indicating that the efficacy of the sample splitting method was very high.

Total number of taxa estimates were always higher when subsample size was increased. The smaller subsample resulted in an average 19 % reduction in the total number of taxa. A parallel reduction in EPT richness was noted. Other metrics seemed to be less variable.

For most of these smaller subsample fractions (A), counts of between 200-300 organisms were conducted. This is still a doubling or more of the 100 organism count advocated by Plafkin et al. (1989). We would expect that richness estimates would be reduced greatly if a 100 organism count was done.

The issue of subsample size (count levels) in the RBP III needs to be more rigorously explored with a proper experimental design. We feel that the 100 organism count subsample is probably inadequate for estimating metric values. Richness metrics are in particular seriously underestimated. Scope sorting was also used in this study. This is a much more unbiased method of sorting.

If a realistic cost analysis was performed, a 300 organism level lab sort and count will undoubtedly turn out to be not only more accurate and robust, but considerably cheaper than having field personnel do a 100 organism eye-ball sort at stream-side.

ACKNOWLEDGEMENTS

This study was funded by MT DHES contract no. 210078. Extension of contract completion deadlines is appreciated. The support of Robert Bukantis of the Water Quality Bureau assured that this project was brought to fruition.

John VanSickle greatly assisted in the development of the computer programs necessary to analyze the data set. John also provided statistical consultation. Richard Miller of TAXON Aquatic Monitoring Services, provided emotional support, advice and lab space. Dave McIntire, Oregon State University, assisted in the running of the DECORANA programs.

Numerous taxonomic specialists assisted on this project. Their contribution is highly appreciated.

Dytiscidae	David J. Larson, Mem. Univ. Newfoundland.
Hydrosychidae	Pat Schefter, Royal Ontario Museum

Chironomidae	Lenny Ferrington, Univ. of Kansas
Molluscs	Terry Frest, Burke Museum, Univ. Wash.
Oligochaeta	Douglas Spencer, Fowlerville, Michigan
Baetidae	Robert Waltz, IN Dept. Natural Resources
Peltoperlidae	Richard Baumann, Brigham Young University
Hemiptera	James Digiulio, Oregon State Univ.
Blephariceridae	Greg Courtney, Smithsonian Institution
Isopoda	William Morton, Guelph, Ontario

REFERENCES

Anonymous. 1953. Natural vegetation of the Americas (map). American Geographic Society, New York.

Bahls, L., R. Bukantis, S. Tralles & R.W. Wisseman. 1991 (in prep.). Benchmark Biology of Montana Reference Streams. Water Quality Bureau, Montana Dept. of Health and Environmental Sciences, Helena, MT.

Frisell, C.A., W.J. Liss, C.E. Warren & M.D. Hurley. 1986. A hierarchical framework for stream habitat classification: Viewing streams in a watershed context. Environmental Management 10: 199-214.

Gauch, H.G. 1982. Multivariate Analysis in Community Ecology. Cambridge University Press, NY, NY. 298 pp.

Hellawell, J.M. 1986. Biological Indicators of Freshwater Pollution and Environmental Management. Elsevier Applied Science Publishers, New York, NY. 546 pp.

Hill, M.O. 1979. DECORANA- A FORTRAN Program for Detrended Correspondence Analysis and Reciprocal Averaging. Cornell University, Ithaca, NY.

Magurran, A.E. 1988. Ecological Diversity and its Measurement. Princeton University Press. Princeton, NJ. 179 pp.

McCafferty, W.P. & R.D. Waltz. 1990. Revisionary synopsis of the Baetidae (Ephemeroptera) of North and Middle America. Trans. Amer. Entomol. Soc. 11:769-799.

Omernik, J.M. & A.L. Gallant. 1986. Ecoregions of the Pacific Northwest. US EPA Publ. 600/3-86/033. 39 pp. + map.

Plafkin, J.L., M.T. Barbour, K.D. Porter, S.K. Gross & R.M. Hughes. 1989. Rapid bioassessment protocols for use in streams and rivers: Benthic macroinvertebrates and fish. U.S. EPA publication EPA/444/4-89-001.

Shackleford, B. 1988. Rapid bioassessments of lotic macroinvertebrate communities: Biocriteria development. Arkansas Dept. of Pollution Control & Ecology, Little Rock, Arkansas. 45 pp.

Southwood, T.R.E. 1977. Habitat, the template for ecological strategies? J. Anim. Ecol. 46: 337-365.

Whittier, T.R., R.M. Hughes & D.P. Larsen. 1988. Correspondence between ecoregions and spatial patterns in stream ecosystems in Oregon. Can. J. Fish. Aquat. Sci. 45: 1264-1278.

Wisseman, R.W. 1992. Montana Rapid Bioassessment Protocols, Benthic Invertebrate Studies, 1990, Demonstration Projects. Aquatic Biology Associates, Corvallis, Oregon report to Montana Water Quality Bureau.

Table . Montana reference streams selected for sampling in 1990.

Ecoregion/Subregion	Stream Name	Tributary of..	General Location	Approximate Sampling Point Twnshp/Rng/Sec	Water Use Class
Northern Rockies (#15)					
Granitics	Wisconsin Cr.	Big Hole R.	W. Pioneer Mtns.	T 3S, R14W, Sec. 9	A-1
	Seymour Cr.	Big Hole R.	Anaconda Range	T 3N, R13W, Sec.23	A-1
	Roaring Lion Cr. above N.F. Boundary	Bitterroot R.	Bitterroot Mtns.	T 5N, R21W, Sec.17	A-1/B-1
Non-Granitics					
West Side	Stony Cr.	Rock Cr.	Deerlodge N.F.	T 6N, R17W, Sec. 1	B-1
	E. Fork Bull R.	Bull R.	Kootenai N.F.	T27N, R32W, Sec. 4	A-1/B-1
	S. Fork Flathead R. above H.H. Res.	Flathead R.	Flathead N.F.	T24N, R14W, Sec.20	A-1/B-1
East Side	Waldron Cr.	N. Fork Teton R.	Teton Co.	T25N, R 9W, Sec.18	B-1
	N. Fork Teton R.	Teton R.	Teton Co.	T25N, R 9W, Sec.16	A-1/B-1
	S. Fork Sun R. above Benchmark	Sun R.	Lewis/Clark Co.	T20N, R10W, Sec. 8	A-1/B-1
Montana Valley and Foothill Prairies (#16)					
Spring Creeks	Ben Hart Spring Cr.	E. Gallatin R.	Gallatin Co.	T 1N, R 4E, Sec.13	B-1
	Armstrong Spring Cr.	Yellowstone R.	Park Co.	T 3S, R 9E, Sec.26	B-1
	Odell Spring Cr.	Madison R.	Madison Co.	T 6S, R 2W, Sec. 3	B-1
Special Creeks	Big Spring Cr. above E. Fork (1)	Judith R.	Fergus	T14N, R19E, Sec. 5	B-1
	Big Hole R. above Divide (2)	Jefferson R.	Beaverhead Co.	T 1N, R13W, Sec. 4	A-1
	Elk Cr. (3)	Madison R.	Madison Co.	T 2S, R 3E, Sec.19	B-1

Table . Montana reference streams selected for sampling in 1990.

Ecoregion/Subregion	Stream Name	Tributary of.	General Location	Approximate Sampling Point Twnshp/Rng/Sec	Water Use Class
Middle Rockies (#17)					
Absaroka-Beartooth Range	Lake Fork Rock Cr.	Rock Cr.	Carbon Co.	T 8S, R19E, Sec.33	A-1/B-1
	Fourmile Cr.	Boulder R.	Park Co.	T 6S, R12E, Sec. 4	A-1
	W. Fork Stillwater R. above Wilderness Boundary	Stillwater R.	Sweet Grass Co.	T 5S, R14E, Sec.14	A-1
	Boulder R. above Fourmile Cr.	Yellowstone R.	Park Co.	T 6S, R12E, Sec. 9	A-1/B-1
Other Geology	Pine Cr.	Trail Cr.	Park Co.	T 4S, R 7E, Sec. 6	B-1
	Calf Cr.	Sheep Cr./Smith R.	Meagher Co.	T12N, R 6E, Sec. 4	B-1
	Crooked Cr.	Bighorn R.	Carbon Co.	T 9S, R27E, Sec. 3	B-1
	Tenderfoot Cr.	Smith R.	Meagher Co.	T13N, R11E, Sec.36	B-1
	Big Creek above N.F. Boundary	Yellowstone R.	Park Co.	T 6S, R 6E, Sec.13	B-1
	W. Gallatin R. above Spanish Cr.	Missouri R.	Gallatin Co.	T 4S, R 4E, Sec. 5	B-1
Wyoming Basin (#18)	Cottonwood Cr. (4)	Clark's Fork R.	Carbon Co.	T 7S, R23E, Sec. 8	B-1
	Jack Cr. (4)	Clark's Fork R.	Carbon Co.	T 7S, R23E, Sec.25	B-1
Northern Montana Glaciated Plains (#41)					
	Rock Cr.	Milk R.	Valley Co.	T36N, R37E, Sec.17	B-3
	Battle Cr.	Milk R.	Blaine Co.	T33N, R19E, Sec. 3	B-3
	Willow Cr.	Marias R.	Toole Co.	T31N, R 3E, Sec. 8	B-2

Table . Montana reference streams selected for sampling in 1990.

Ecoregion/Subregion	Stream Name	Tributary of..	General Location	Approximate Sampling Point Twnshp/Rng/Sec	Water Use Class
Northernwestern Glaciated Plains (#42)					
	Tule Cr.	Missouri R.	Roosevelt Co.	T28N, R48E, Sec.14	C-3
	W. Fork Poplar R.	Poplar R.	Roosevelt Co.	T32N, R48E, Sec. 1	B-2
	Redwater R.	Missouri R.	McCone Co.	T25N, R50E, Sec.23	C-3
Northwestern Great Plains (#43)					
	Larb Cr.	Milk R.	Valley Co.	T30N, R34E, Sec. 2	B-3
	Boxelder Cr.	L. Missouri R.	Carter Co.	T 1N, R60E, Sec.27	C-3
	Hanging Woman Cr.	Tongue R.	Rosebud Co.	T 6S, R43E, Sec.19	C-3
	O'Fallon Cr. above Highway 12	Yellowstone R.	Fallon Co.	T 8N, R56E, Sec.30	C-3
	Tongue R. above Prairie Dog. Cr. (5)	Yellowstone R.	Rosebud Co.	T 6S, R42E, Sec.31	B-2

(1) Reference stream for lower Big Spring Creek
(2) Reference stream for upper Clark Fork River
(3) Reference stream for Godfrey Creek
(4) Only one of these two streams will be sampled in the spring of 1991; they carried no water in summer 1990
(5) Reference stream for Musselshell River

Table 2

Dominant Taxa in Plains and Montane Reference Streams

Mean of taxa abundances at all sites and mean percent contribution.
The most numerous 34 (mean no taxa found at montane sites)
and 29 (mean number of taxa found at plains sites) are ranked.

Montane

		Mean	Percent
1	*Baetis tricaudatus*	53.3	9.28
2	*Rhithrogena*	51.9	9.05
3	*Drunella doddsi*	40.6	7.07
4	*Epeorus albertae*	35.0	6.10
5	*Cinygmula*	32.3	5.63
6	*Epeorus grandis*	32.3	5.63
7	*Glossosoma*	22.4	3.90
8	*Orthocladius*	17.4	3.04
9	*Yoraperla*	17.4	3.04
10	*Brachycentrus americanus*	17.1	2.97
11	*Epeorus longimanus*	16.6	2.89
12	*Zapada columbiana*	15.7	2.73
13	*Serratella tibialis*	11.4	1.98
14	*Zapada Oregonensis Group*	11.3	1.97
15	*Eukiefferiella*	10.7	1.86
16	*Cricotopus Nostococladius*	8.3	1.45
17	*Rhyacophila Brunnea Group*	8.2	1.42
18	*Megarcys*	8.1	1.40
19	*Optioservus*	8.0	1.39
20	*Micropsectra*	7.2	1.25
21	*Drunella grandis*	6.9	1.20
22	*Heterlimnius*	6.8	1.18
23	*Arctopsyche grandis*	5.6	0.97
24	Turbellaria	5.5	0.96
25	*Drunella coloradensis*	5.3	0.93
26	*Hydropsyche*	5.2	0.91
27	*Tvetenia*	5.1	0.89
28	*Brachycentrus occidentalis*	4.6	0.80
29	*Apatania*	4.5	0.78
30	*Neothremma alicia*	4.3	0.75
31	*Micrasema*	3.8	0.67
32	*Rhyacophila Hyalinata Group*	3.8	0.67
33	*Ameletus*	3.7	0.65
34	*Hesperoperla pacifica*	3.3	0.58

Plains

		Mean	Percent
1	*Physella*	764.8	20.74
2	*Hyallela azteca*	522.5	14.17
3	*Caenis*	480.3	13.03
4	Simuliidae	341.8	9.27
5	Cladocera	183.0	4.96
6	Coenagrionidae	164.5	4.46
7	*Callibaetis*	103.4	2.80
8	*Cheumatopsyche*	94.1	2.55
9	Oligochaeta	91.0	2.47
10	Planorbidae	88.2	2.39
11	*Paratanytarsus*	84.8	2.30
12	*Micropsectra*	78.4	2.13
13	Corixidae	63.5	1.72
14	Ceratopogonidae	60.0	1.63
15	*Pseudochironomus*	48.8	1.32
16	*Tanytarsus*	36.6	0.99
17	*Dicrotendipes*	32.5	0.88
18	*Cricotopus*	29.3	0.79
19	Ostracoda	23.7	0.64
20	*Hydroptila*	23.0	0.62
21	*Conchapelopia/Thienemannim*	21.4	0.58
22	Copepoda	20.3	0.55
23	*Rheotanytarsus*	20.2	0.55
24	*Ablabesmyia*	18.2	0.49
25	*Psectrocladius*	17.2	0.47
26	Haliplidae	15.8	0.43
27	*Gammarus*	15.3	0.42
28	Culicidae	15.3	0.42
29	*Cinygmula*	14.0	0.38

Table 3

Dominant Taxa in Spring Reference Streams-1990 Version.

Mean of taxa abundances at all sites and mean percent contribution.
The most numerous 34 (mean no. taxa found at the Spring Creek sites).
File: 90SPRDOM

	Taxon	Mean	Percent
1	*Lepidostoma-sand case*	347.8	13.78
2	*Brachycentrus americanus*	201.8	8.00
3	*Hydropsyche*	187.3	7.44
4	*Optioservus*	159.3	6.31
5	*Baetis tricaudatus*	144.5	5.73
6	Porifera	132.5	5.25
7	*Eukiefferiella*	121.5	4.82
8	*Tvetenia*	112.3	4.45
9	*Agapetus*	94.0	3.73
10	*Ephemerella inermis*	74.5	2.95
11	*Glossosoma*	74.3	2.94
12	*Pagastia*	66.3	2.63
13	*Physella*	57.0	2.26
14	*Hydroptila*	52.3	2.07
15	*Tricorythodes minutus*	47.3	1.87
16	*Brachycentrus occidentalis*	42.5	1.68
17	*Micrasema*	36.5	1.45
18	*Orthocladius*	33.5	1.33
19	*Heptagenia*	19.5	1.26
20	*Helicopsyche borealis*	27.0	1.07
21	Lymnaeidae	26.8	1.06
22	*Zaitzevia*	24.0	0.95
23	*Micropsectra*	21.3	0.84
24	Simuliidae	21.0	0.83
25	*Attenella margarita*	20.0	0.79
26	Turbellaria	19.8	0.78
27	*Heptagenia*	19.5	0.77
28	Ceratopogonidae	19.3	0.76
29	*Caecidotea*	18.5	0.73
30	*Polypedilum*	18.0	0.71
31	*Cricotopus Nostococladius*	17.5	0.69
32	*Diphetor hageni*	15.8	0.62
33	*Heterlimnius*	15.5	0.61
34	Oligochaeta	15.0	0.59

Table 4

Montana Reference Stream Metric Summary
Rocky Mountains Streams and Rivers-Riffle Samples.

Modified Rapid Bioassessment Protocol 3
Benthic macroinvertebrate community analysis.

	Northern Rockies Granitics			Nothern Rockies Non-Gran. West side			Nothern Rockies Non-Gran. East side			Middle Rockies Absaroka-Beartooth Range			
METRIC	WISC	SEYM	ROAR	STON	EFBU	SFFL	WALD	NFTE	SFSU	LFRO	FOUR	STI1	STI2
TOTAL ABUNDANCE	846	387	912	474	384	199	828	522	916	580	555	569	316
EPT ABUNDANCE	694	263	652	407	355	193	744	518	762	456	497	521	262
ABUN. BY GROUP													
Misc. Taxa	46	10	4	10	5	0	40	0	2	4	23	11	2
Odonata	0	0	0	0	0	0	0	0	0	0	0	0	0
Ephemeroptera	116	163	500	229	298	178	334	401	538	348	297	478	237
Plecoptera	174	39	60	110	25	7	346	100	94	84	80	22	15
Hemiptera	0	0	0	0	0	0	0	0	0	0	0	0	0
Megaloptera	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera	404	61	92	68	32	8	64	17	130	24	120	21	10
Lepidoptera	0	0	0	0	0	0	0	0	0	0	0	0	0
Coleoptera	4	3	0	6	0	2	0	0	8	0	4	2	2
Misc. Diptera	26	9	16	2	3	2	30	2	20	16	7	3	12
Chironomidae	76	102	240	49	21	2	14	2	124	104	24	32	38
% CONTR. BY GROUP													
Misc. Taxa	5.44	2.59	0.44	2.1	1.3	0	4.83	0	0.22	0.69	4.14	1.93	0.64
Odonata	0	0	0	0	0	0	0	0	0	0	0	0	0
Ephemeroptera	13.71	42.13	54.83	48.31	77.6	89.45	40.32	76.82	58.72	60.01	53.5	84.02	74.99
Plecoptera	20.56	10.08	6.59	23.2	6.51	3.53	41.77	19.15	10.27	14.49	14.41	3.88	4.75
Hemiptera	0	0	0	0	0	0	0	0	0	0	0	0	0
Megaloptera	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera	47.75	15.78	10.11	14.33	8.33	4.02	7.72	3.25	14.2	4.14	21.61	3.71	3.19
Lepidoptera	0	0	0	0	0	0	0	0	0	0	0	0	0
Coleoptera	0.48	0.78	0	1.27	0	1.01	0	0	0.87	0	0.72	0.35	0.63
Misc. Diptera	3.08	2.33	1.76	0.42	0.78	1.01	3.62	0.38	2.19	2.76	1.26	0.53	3.8
Chironomidae	8.97	2.37	26.33	10.33	5.46	1.01	1.69	0.38	13.54	17.94	4.32	5.62	12.03
TOTAL TAXA RICHNESS	36	58	37	49	27	14	32	25	43	32	45	36	38
EPT RICHNESS	18	35	22	34	20	11	24	21	27	18	30	26	24
RICHNESS BY GROUP													
Misc. Taxa	5	3	1	3	2	0	3	0	1	1	4	2	2
Odonata	0	0	0	0	0	0	0	0	0	0	0	0	0
Ephemeroptera	5	14	7	11	9	7	7	9	9	8	10	10	10
Plecoptera	7	10	5	12	6	3	9	7	7	6	8	8	6
Hemiptera	0	0	0	0	0	0	0	0	0	0	0	0	0
Megaloptera	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera	6	11	10	11	5	1	8	5	11	4	12	8	8
Lepidoptera	0	0	0	0	0	0	0	0	0	0	0	0	0
Coleoptera	2	1	0	1	0	1	0	0	1	0	1	1	1
Misc. Diptera	5	4	2	2	1	1	3	2	5	2	4	1	4
Chironomidae	6	15	12	9	4	1	2	2	9	11	6	6	7
RATIOS TAX. GROUP													
ABUNDANCES													
EPT/Chironomidae	9.13	2.58	2.72	8.31	16.9	96.5	53.14	259	6.15	4.38	20.71	16.28	6.89
Hydropsy./Trichoptera	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Baetidae/Ephemeroptera	0	0.15	0.1	0.06	0.12	0.1	0.39	0.11	0.06	0.32	0.02	0.08	0.14

Montana Reference Stream Metric Summary
Rocky Mountains Streams and Rivers-Riffle Samples.

Modified Rapid Bioassessment Protocol 3

Benthic macroinvertebrate community analysis.

		Middle Rockies Other Geology										
METRIC	BOUL	PINE	CALF	CRO1	CRO2	TEND	BIGC	WGAL	Mean	Min.	Max.	STDEV
TOTAL ABUNDANCE	582	324	456	306	352	1184	285	820	548	199	1184	253.7
EPT ABUNDANCE	562	234	244	294	311	724	241	644	444	193	762	185.0
ABUN. BY GROUP												
Misc. Taxa	2	27	5	6	6	0	2	12	9	0	23	10.1
Odonata	0	0	0	0	0	0	0	0	0	0	0	0.0
Ephemeroptera	488	40	134	256	287	108	224	172	286	40	478	136.4
Plecoptera	52	109	66	4	5	24	5	48	65	4	346	73.7
Hemiptera	0	0	0	0	0	0	0	0	0	0	0	0.0
Megaloptera	0	0	0	0	0	0	0	0	0	0	0	0.0
Trichoptera	22	85	44	34	19	592	12	424	94	8	592	144.9
Lepidoptera	0	0	0	0	0	0	0	0	0	0	0	0.0
Coleoptera	2	4	137	0	2	128	2	0	15	0	137	39.2
Misc. Diptera	2	6	28	0	8	44	0	112	16	0	112	24.8
Chironomidae	14	53	42	6	25	288	40	52	64	2	288	74.9
% CONTR. BY GROUP												
Misc. Taxa	0.34	8.33	1.1	1.96	1.71	0	0.7	1.46	1.7	0.0	8.3	2.0
Odonata	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Ephemeroptera	83.83	12.36	29.39	83.66	81.53	9.12	78.59	20.97	58.0	9.1	89.5	24.9
Plecoptera	8.93	33.64	14.49	1.3	1.41	2.03	1.75	5.85	11.4	1.3	41.8	10.7
Hemiptera	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Megaloptera	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Trichoptera	3.78	26.24	9.67	11.1	5.4	50	4.2	51.7	13.6	3.2	51.7	13.9
Lepidoptera	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Coleoptera	0.34	1.23	30.04	0	0.56	10.81	0.7	0	2.5	0.0	30.0	6.7
Misc. Diptera	0.34	1.86	6.14	0	2.27	3.72	0	13.66	2.4	0.0	13.7	3.0
Chironomidae	2.4	16.37	9.21	1.96	7.09	24.35	14.02	6.35	9.1	1.0	24.4	7.5
TOTAL TAXA RICHNESS	30	34	44	17	26	32	29	26	34	14	58	10.3
EPT RICHNESS	23	17	25	13	16	20	20	15	22	11	35	6.2
RICHNESS BY GROUP												
Misc. Taxa	1	2	3	2	2	0	1	1	2	0	4	1.1
Odonata	0	0	0	0	0	0	0	0	0	0	0	0.0
Ephemeroptera	12	6	9	7	6	8	9	6	9	6	14	2.1
Plecoptera	7	5	7	2	4	3	3	4	6	3	10	2.5
Hemiptera	0	0	0	0	0	0	0	0	0	0	0	0.0
Megaloptera	0	0	0	0	0	0	0	0	0	0	0	0.0
Trichoptera	4	6	9	4	6	9	8	5	7	1	12	2.9
Lepidoptera	0	0	0	0	0	0	0	0	0	0	0	0.0
Coleoptera	1	1	3	0	2	2	1	0	1	0	3	0.8
Misc. Diptera	1	5	5	0	2	1	0	5	3	0	5	1.7
Chironomidae	4	9	8	2	4	9	7	5	7	1	15	3.6
RATIOS TAX. GROUP												
ABUNDANCES												
EPT/Chironomidae	40.14	4.42	5.81	49	12.44	2.51	6.03	12.38	31.3	2.5	259.0	57.1
Hydropsy./Trichoptera	0	0	0	0.18	0.16	0.07	0	0.12	0.0	0.0	0.2	0.1
Baetidae/Ephemeroptera	0.21	0	0.12	0.7	0.63	0.3	0.36	0.47	0.2	0.0	0.7	0.2

Rocky Mountains Streams and Rivers-Riffle samples cont.

	Northern Rockies Granitics			Nothern Rockies Non-Gran. West side			Nothern Rockies Non-Gran. East side			Middle Rockies Absaroka-Beartooth Range			
METRIC	WISC	SEYM	ROAR	STON	EFBU	SFFL	WALD	NFTE	SFSU	LFRO	FOUR	STI1	STI2
FFG % CONTRIBUTION													
Predator	8.29	18.63	6.6	13.28	9.1	7.55	17.62	6.89	16.16	12.42	13.32	5.65	6.97
Parasite	0.71	0.26	0	0	0	0	0	0	0	0	0.18	0	0
Collector-gatherer	20.33	31.8	25.02	15.61	25.77	41.71	37.91	20.5	41.69	39.32	15.3	23.73	30.7
Collector-filterer	0.47	4.65	8.78	0.21	0.78	0	0	0.19	0.22	0.69	0.54	0.18	1.59
Macrophyte-herbivore	0	4.65	0.44	0	0	0	0	0	0.66	0	3.6	0	0
Piercer-herbivore	1.89	3.36	0	5.7	0	0	0	0	2.4	0	1.98	0	0
Scraper	47.05	22.23	45.62	39.24	57.03	49.76	8.44	56.7	26.2	31.73	51.53	65.03	53.48
Shredder	16.21	6.72	7.9	19.4	5.73	0	34.29	15.51	5.46	8.28	10.09	2.46	2.53
Xylophage	0	0	0	0	0	0	0	0	0	0	0	0	0
Omnivore	2.6	7.76	5.7	5.06	1.56	1.01	1.69	0.19	5.25	4.83	3.24	2.29	2.54
Unknown	0.47	0	0	1.47	0	0	0	0	1.97	2.76	0.18	0.7	2.22
RATIOS FFG ABUN.													
SC/CF	99.5	4.78	5.2	186	73	0	0	296	120	46	95.33	370	33.8
SC/(SC+CF)	0.99	0.83	0.84	0.99	0.99	1	1	1	0.99	0.98	0.99	1	0.97
SH/Total organisms	0.162	0.067	0.079	0.194	0.057	0	0.343	0.155	0.055	0.083	0.101	0.025	0.025
% CONTRIBUTION													
Dominat taxa (1st)	42.79	10.85	23.68	11.18	25.26	34.67	20.77	44.25	23.14	28.97	32.61	34.62	24.37
Dominant taxa (5)	76.59	35.66	58.77	47.46	75	89.94	70.52	76.44	54.57	60.01	55.86	73.82	66.77
Dominant taxa (10)	88.76	58.13	76.76	70.46	88.54	95.99	86.71	92.72	70.08	75.19	71.7	87.88	81.32
SAPROBIC INDICES													
Hilsenhoff Biotic Index	1.47	2.97	2.71	1.64	1.28	1.16	2.16	1.12	1.49	3.95	1.39	2.08	2.87
BCI: CTQa	63.26	57.16	54.22	54.37	45.52	35.57	42.32	30.92	50.77	59.25	49.87	45.17	55.53
BCI:CTQd	131	125	101	119	106	71	77	34	81	110	79	80	116
DIVERSITY MEASURES													
Shannon H (loge)	2.22	3.47	2.8	3.16	2.37	1.78	2.53	2.07	2.92	2.67	2.83	2.34	2.6
Shannon H (log2)	3.2	5	4.04	4.56	3.42	2.56	3.65	2.99	4.21	3.85	4.08	3.38	3.75
Evenness	0.62	0.85	0.78	0.81	0.72	0.67	0.73	0.64	0.78	0.77	0.74	0.65	0.71
Brillouin H	2.14	3.24	2.72	3	2.26	1.67	2.46	2	2.83	2.56	2.7	2.24	2.42
Simpson D	0.22	0.04	0.11	0.06	0.14	0.23	0.12	0.23	0.1	0.13	0.13	0.17	0.13
VOLTINISM (% CONTR.)													
Multivoltine	11.7	25.39	24.45	11.71	12.24	7.16	17.39	6.75	13.16	27.93	8.33	9.45	17.25
Univoltine	84.87	63.11	72.48	81.22	81.51	84.3	77.78	91.43	76.91	63.79	82.84	85.98	80.22
Semivoltine	3.43	11.5	3.07	7.07	6.25	8.54	4.83	1.82	9.93	8.28	8.83	4.57	2.53

Wisconsin Creek site not included in mean or range.

Rocky Mountains Streams and Rivers-Riffle samples cont.

		Middle Rockies Other Geology										
METRIC	BOUL	PINE	CALF	CRO1	CRO2	TEND	BIGC	WGAL	Mean	Min.	Max.	STDEV
FFG % CONTRIBUTION												
Predator	8.93	5.25	15.16	6.53	4.25	7.77	3.15	18.53	10.2	3.2	18.6	4.9
Parasite	0	0	0.66	0	0	0	0	0	0.1	0.0	0.7	0.2
Collector-gatherer	30.91	25.93	48.45	70.58	74.42	29.41	61.04	26.83	35.8	15.3	74.4	16.3
Collector-filterer	0.34	2.47	1.98	1.96	2.27	3.38	0	8.05	1.9	0.0	8.8	2.5
Macrophyte-herbivore	0	5.25	0	0	0	0.34	0	0	0.7	0.0	5.3	1.6
Piercer-herbivore	0	0	0	0	0.57	6.42	0.7	0	1.1	0.0	6.4	1.9
Scraper	56.01	24.39	23.26	17	11.36	22.3	28.76	33.65	36.2	8.4	65.0	16.6
Shredder	3.09	32.41	7.46	1.3	0.57	4.73	0.7	0	8.4	0.0	34.3	9.7
Xylophage	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Omnivore	0.34	3.4	2.63	2.61	6.53	25	5.61	12.44	5.0	0.2	12.4	5.4
Unknown	0.34	0.93	0.44	0	0	0.68	0	0.49	0.6	0.0	2.8	0.8
RATIOS FFG ABUN.												
SC/CF	163	9.88	11.78	8.67	5	6.6	0	4.18	72.0	0.0	370.0	103.6
SC/(SC+CF)	0.99	0.91	0.92	0.9	0.83	0.87	1	0.81	0.9	0.8	1.0	0.1
SH/Total organisms	0.031	0.324	0.075	0.013	0.006	0.047	0.007	0	0.1	0.0	0.3	0.1
% CONTRIBUTION												
Dominat taxa (1st)	26.12	27.47	20.39	55.56	50	22.97	28.42	32.68	28.9	10.9	55.6	11.0
Dominant taxa (5)	71.13	66.05	51.98	84.32	84.66	60.13	67.37	66.09	65.8	35.7	89.9	13.0
Dominant taxa (10)	87.62	82.42	66.45	94.77	91.76	77.71	89.46	87.56	81.7	58.1	94.8	10.2
SAPROBIC INDICES												
Hilsenhoff Biotic Index	2.18	2.18	3.24	4.41	4.59	2.64	3.6	2.31	2.5	1.1	4.6	1.0
BCI: CTQa	44.5	62.09	55.98	54.71	62.81	56.25	48.41	57.31	51.1	30.9	62.8	8.2
BCI:CTQd	71	131	129	116	143	95	87	96	98.4	34.0	143.0	25.7
DIVERSITY MEASURES												
Shannon H (loge)	2.47	2.59	3.1	1.73	1.85	2.75	2.46	2.43	2.55	1.73	3.47	0.44
Shannon H (log2)	3.56	3.73	4.48	2.5	2.67	3.97	3.55	3.5	3.67	2.50	5.00	0.64
Evenness	0.73	0.73	0.82	0.61	0.57	0.79	0.73	0.75	0.73	0.57	0.85	0.07
Brillouin H	2.34	2.43	2.94	1.64	1.75	2.69	2.31	2.37	2.43	1.64	3.24	0.42
Simpson D	0.13	0.13	0.08	0.33	0.29	0.1	0.13	0.15	0.15	0.04	0.33	0.07
VOLTINISM (% CONTR.)												
Multivoltine	15.29	20.6	10.25	46.24	44.67	21.11	32.54	13.66	19.3	7.2	46.2	11.2
Univoltine	81.79	77.08	52.47	47.55	51.21	39.36	64.47	67.8	71.2	39.4	91.4	14.0
Semivoltine	2.92	2.31	37.28	6.21	4.12	39.53	2.98	18.54	9.6	1.8	39.5	10.4

Wisconsin Creek site not included in mean or range.

Table 5

Montana Reference Stream Metric Summary
Plains Streams and Rivers-Riffle samples.

Modified Rapid Bioassessment Protocol 3
Benthic macroinvertebrate community analysis.

METRIC	TONG	BATA	BATB	BOXE	HANG	LARB	OFAL	POPA	POPB
TOTAL ABUNDANCE	2376	3076	1116	314	17104	1316	656	4912	1018
EPT ABUNDANCE	1052	620	480	172	4016	148	84	560	254
ABUN. BY GROUP									
Misc. Taxa	224	1340	328	7	9680	772	12	192	162
Odonata	0	60	84	12	1152	104	52	176	14
Ephemeroptera	984	340	92	122	3936	128	84	152	176
Plecoptera	0	0	0	0	0	0	0	0	0
Hemiptera	120	0	0	22	160	220	328	16	20
Megaloptera	0	0	0	3	0	0	0	0	0
Trichoptera	68	280	388	50	80	20	0	408	78
Lepidoptera	0	0	0	1	0	0	0	0	0
Coleoptera	804	16	20	1	128	16	0	8	4
Misc. Diptera	100	88	8	0	752	8	28	3656	384
Chironomidae	76	952	196	96	1216	48	152	304	180
% CONTR. BY GROUP									
Misc. Taxa	9.44	43.55	29.41	2.24	56.59	58.66	1.83	3.9	15.93
Odonata	0	1.95	7.53	3.82	6.73	7.9	7.93	3.58	1.38
Ephemeroptera	41.42	11.05	8.24	38.86	23.01	9.73	12.81	3.09	17.3
Plecoptera	0	0	0	0	0	0	0	0	0
Hemiptera	5.05	0	0	7.01	0.94	16.72	50	0.32	1.97
Megaloptera	0	0	0	0.96	0	0	0	0	0
Trichoptera	2.87	9.1	34.77	15.92	0.47	1.52	0	8.3	7.66
Lepidoptera	0	0	0	0.32	0	0	0	0	0
Coleoptera	33.84	0.52	1.79	0.32	0.74	1.21	0	0.16	0.4
Misc. Diptera	4.21	2.86	0.72	0	4.4	0.61	4.27	74.43	37.72
Chironomidae	3.2	30.96	17.57	30.57	7.1	3.64	23.18	6.19	17.66
TOTAL TAXA RICHNESS	27	47	27	27	33	28	17	26	39
EPT RICHNESS	12	11	9	10	3	5	2	6	11
RICHNESS BY GROUP									
Misc. Taxa	5	15	8	3	7	8	2	6	9
Odonata	0	1	1	1	2	2	1	1	1
Ephemeroptera	6	5	5	6	2	2	2	3	7
Plecoptera	0	0	0	0	0	0	0	0	0
Hemiptera	1	0	0	1	4	3	1	2	2
Megaloptera	0	0	0	1	0	0	0	0	0
Trichoptera	6	6	4	4	1	3	0	3	4
Lepidoptera	0	0	0	1	0	0	0	0	0
Coleoptera	2	3	2	1	4	3	0	1	2
Misc. Diptera	3	4	1	0	4	1	1	2	2
Chironomidae	4	7	6	9	9	6	10	8	12
RATIOS TAX. GROUP									
ABUNDANCES									
EPT/Chironomidae	13.84	0.65	2.45	1.79	3.3	3.08	0.55	1.84	1.41
Hydropsy./Trichoptera	0	0.91	0.95	0.78	0	0.2	0	0.96	0.64
Baetidae/Ephemeroptera	0.55	0.11	0.17	0.07	0.21	0.56	0.48	0.95	0.57

Montana Reference Stream Metric Summary
Plains Streams and Rivers-Riffle samples.

Modified Rapid Bioassessment Protocol 3
Benthic macroinvertebrate community analysis.

METRIC	REDW	ROCK	TULE	WILL	Mean	Min	Max	STDEV
TOTAL ABUNDANCE	260	2355	1516	12379	3835	260	17104	5126.1
EPT ABUNDANCE	20	184	108	2496	762	20	4016	1172.3
ABUN. BY GROUP								
Misc. Taxa	20	464	784	7616	1781	7	9680	3122.7
Odonata	80	136	184	120	181	12	1152	297.5
Ephemeroptera	20	168	108	2272	633	20	3936	1158.3
Plecoptera	0	0	0	0	0	0	0	0.0
Hemiptera	12	104	68	128	90	0	328	99.1
Megaloptera	0	0	0	0	0.3	0	3	0.8
Trichoptera	0	16	0	224	129	0	408	147.9
Lepidoptera	0	0	0	0	0	0	1	0.3
Coleoptera	4	32	100	40	31	0	128	39.4
Misc. Diptera	0	192	4	160	440	0	3656	992.8
Chironomidae	124	1243	268	1819	550	48	1819	569.8
% CONTR. BY GROUP								
Misc. Taxa	7.69	19.7	51.7	61.52	29.4	1.8	61.5	22.8
Odonata	30.77	5.77	12.14	0.96	7.5	1.0	30.8	7.7
Ephemeroptera	7.69	7.13	7.12	18.36	13.7	3.1	38.9	9.3
Plecoptera	0	0	0	0	0.0	0.0	0.0	0.0
Hemiptera	4.62	4.42	4.49	1.03	7.6	0.0	16.7	13.5
Megaloptera	0	0	0	0	0.1	0.0	1.0	0.3
Trichoptera	0	0.68	0	1.8	6.7	0.0	34.8	9.8
Lepidoptera	0	0	0	0	0.0	0.0	0.3	0.1
Coleoptera	1.54	1.36	6.6	0.32	1.2	0.0	6.6	1.7
Misc. Diptera	0	8.16	0.26	1.28	11.2	0.0	74.4	21.5
Chironomidae	47.71	52.77	17.69	14.69	22.5	6.2	52.8	14.9
TOTAL TAXA RICHNESS	11	37	26	35	29	11	47	9.3
EPT RICHNESS	1	4	4	5	6	1	11	3.4
RICHNESS BY GROUP								
Misc. Taxa	1	6	8	7	7	1	15	3.5
Odonata	1	1	1	2	1	1	2	0.4
Ephemeroptera	1	2	4	2	3	1	7	1.8
Plecoptera	0	0	0	0	0	0	0	0.0
Hemiptera	1	2	2	1	2	0	4	1.1
Megaloptera	0	0	0	0	0.1	0	1	0.3
Trichoptera	0	2	0	3	3	0	6	1.8
Lepidoptera	0	0	0	0	0	0	1	0.3
Coleoptera	1	3	2	2	2	0	4	1.1
Misc. Diptera	0	4	1	4	2	0	4	1.5
Chironomidae	6	17	8	14	9	6	14	3.3
RATIOS TAX. GROUP								
ABUNDANCES								
EPT/Chironomidae	0.16	0.15	0.4	1.37	1.43	0.16	3.30	1.1
Hydropsy./Trichoptera	0	0.5	0	0.25	0.43	0.00	0.96	0.4
Baetidae/Ephemeroptera	0	0.05	0.74	0.04	0.33	0.00	0.95	0.3

Plains streams and rivers-Riffle samples. cont.

METRIC	Tong	BatA	BatB	BoxE	Hang	Larb	OFal	PopA	PopB
FFG % CONTRIBUTION									
Predator	6.22	7.44	10.05	12.42	11.87	12.15	17.08	5.53	6.68
Parasite	0	2.6	2.51	0	0	2.13	0	0	0
Collector-gatherer	86.38	66.65	39.43	38.54	81.48	36.17	30.5	7.32	30.26
Collector-filterer	3.37	13.03	37.28	13.7	3.55	2.43	0.61	85.67	55.4
Macrophyte-herbivore	0	0.13	0	0	0.47	0.3	0	0	0.2
Piercer-herbivore	1.52	0.39	0.72	0	1.03	0	0	0.16	1.57
Scraper	1.69	6.24	7.53	26.12	1.12	28.87	0	0.48	1.39
Shredder	0	0	0	0	0	0	0	0	0
Xylophage	0	0	0	0	0	0	0	0	0
Omnivore	0.84	0.26	0.36	0.96	0	0.91	0	0.65	0.59
Unknown	0	3.25	2.15	8.28	0.46	17.03	51.83	0.16	3.93
RATIOS FFG ABUN.									
SC/CF	0.5	0.48	0.2	1.91	0.32	11.88	0	0	0.02
SC/(SC+CF)	0.33	0.32	0.17	0.66	0.24	0.92	0	0	0.02
SH/Total organisms	0	0	0	0	0	0	0	0	0
% CONTRIBUTION									
Dominat taxa (1st)	33.33	20.29	32.97	25.16	46.96	28.57	50	74.27	37.13
Dominant taxa (5)	61.82	61.25	72.05	62.1	80.35	72.03	77.45	91.37	68.96
Dominant taxa (10)	92.94	80.9	88.54	83.11	91.2	89.67	95.14	96.58	81.13
SAPROBIC INDICES									
Hilsenhoff Biotic Index	4.3	6.72	6.42	6.09	7.59	7.69	7.82	6.17	6.01
BCI: CTQa	91.37	94.68	94.48	92.38	97.52	97.87	103.8	100.2	93.63
BCI:CTQd	145	158	192	179	131	204	188	195	186
DIVERSITY MEASURES									
Shannon H (loge)	2.09	2.74	2.35	2.62	1.99	2.38	1.9	1.18	2.51
Shannon H (log2)	3.01	3.95	3.39	3.78	2.86	3.43	2.75	1.7	3.62
Evenness	0.63	0.74	0.71	0.8	0.57	0.71	0.67	0.36	0.68
Brillouin H	2.06	2.7	2.3	2.48	1.98	2.33	1.85	1.17	2.43
Simpson D	0.19	0.1	0.16	0.11	0.26	0.14	0.28	0.56	0.17
VOLTINISM (% CONTR.)									
Multivoltine	26.18	31.34	27.96	30.1	13.82	12.54	22.56	9.61	23.62
Univoltine	38.8	63.72	70.25	69.59	83	82.6	77.44	90.07	75.49
Semivoltine	35.02	4.94	1.79	0.32	3.18	4.86	0	0.33	0.88

Tongue River site not included in mean or range.

Plains streams and rivers-Riffle sample

METRIC	Redw	Rock	Tule	Will	Mean	Min	Max	STDEV
FFG % CONTRIBUTION								
Predator	32.31	15.88	14.78	3.51	12.5	3.5	32.3	7.2
Parasite	0	0	0	0	0.6	0.0	2.6	1.0
Collector-gatherer	50.78	49.66	72.82	69.24	47.7	7.3	81.5	20.7
Collector-filterer	0	10.71	2.64	15.29	20.0	0.0	37.3	25.4
Macrophyte-herbivore	0	0.34	6.07	0.06	0.6	0.0	6.1	1.6
Piercer-herbivore	0	0	0	1.29	0.4	0.0	1.6	0.6
Scraper	0	0	0.26	3.1	6.3	0.0	28.9	9.8
Shredder	0	0	0	0	0.0	0.0	0.0	0.0
Xylophage	0	0	0	0	0.0	0.0	0.0	0.0
Omnivore	7.69	2.29	0	0.2	1.2	0.0	7.7	2.1
Unknown	9.24	21.11	3.43	7.27	10.7	0.2	51.8	13.9
RATIOS FFG ABUN.								
SC/CF	0	0	0.1	0.2	1.3	0.0	11.9	3.2
SC/(SC+CF)	undefi	0	0.09	0.17	0.2	0.0	0.9	0.3
SH/Total organisms	0	0	0	0	0.0	0.0	0.0	0.0
% CONTRIBUTION								
Dominat taxa (1st)	30.77	13.29	15.83	41.94	34.8	13.3	74.3	16.3
Dominant taxa (5)	81.54	48.49	64.38	82.37	71.9	48.5	91.4	11.2
Dominant taxa (10)	98.48	74.48	87.34	90.61	88.1	74.5	98.5	6.8
SAPROBIC INDICES								
Hilsenhoff Biotic Index	7.83	7	7.46	7.58	7.0	6.1	7.8	0.7
BCI: CTQa	104.4	101.7	97.62	99.77	98.2	92.4	104.4	3.8
BCI:CTQd	166	156	158	139	171.0	131.0	204.0	22.2
DIVERSITY MEASURES								
Shannon H (loge)	1.98	2.98	2.58	2.05	2.3	1.2	3.0	0.5
Shannon H (log2)	2.86	4.3	3.72	2.95	3.3	1.7	4.3	0.7
Evenness	0.83	0.83	0.79	0.58	0.7	0.4	0.8	0.1
Brillouin H	1.9	2.94	2.54	2.04	2.2	1.2	2.9	0.4
Simpson D	0.18	0.07	0.1	0.23	0.2	0.1	0.6	0.1
VOLTINISM (% CONTR.)								
Multivoltine	35.77	41.45	20.25	27.06	24.7	9.6	41.5	9.2
Univoltine	55	51.58	69.99	72.55	71.8	55.0	90.1	10.8
Semivoltine	9.23	6.96	9.76	0.39	3.6	0.0	9.8	3.4

Tongue River site not included in mean or range.

Table 6

Montana Reference Stream Metric Summary 1990
Spring Creeks and Special Creeks- Riffle samples.

Modified Rapid Bioassessment Protocol 3
Benthic macroinvertebrate community analysis.

METRIC	ARMS	BENH	BH34	BHFT	BIGS	ELKC	ODE1	ODE2	BIGO	Mean	Min.	Max.	STDEV
TOTAL ABUNDANCE	2546	2476	1828	3936	5456	1450	1668	780	824	2329	684	5456	1435.8
EPT ABUNDANCE	820	1912	480	2032	5216	568	556	200	502	1365	200	5216	1492.4
ABUN. BY GROUP													
Misc. Taxa	706	60	1066	88	104	16	216	58	112	270	16	1066	344.1
Odonata	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Ephemeroptera	500	804	198	616	512	236	108	92	90	351	70	804	248.2
Plecoptera	0	0	30	32	24	42	30	16	10	20	0	42	14.0
Hemiptera	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Megaloptera	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Trichoptera	320	1108	252	1384	4680	290	418	92	402	994	92	4680	1364.1
Lepidoptera	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Coleoptera	24	100	78	192	16	406	746	342	40	216	0	746	229.4
Misc. Diptera	20	44	24	112	56	112	18	22	86	55	18	112	36.9
Chironomidae	976	360	180	1512	64	348	132	158	84	424	10	1512	466.6
% CONTR. BY GROUP													
Misc. Taxa	27.71	2.42	58.32	2.23	1.92	1.11	12.95	7.43	13.58	14.2	1.1	58.3	17.6
Odonata	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Ephemeroptera	19.64	32.46	10.85	15.65	9.39	16.29	6.48	11.79	10.93	14.8	6.5	32.5	7.3
Plecoptera	0	0	1.65	0.8	0.44	2.9	1.8	2.05	1.21	1.2	0.0	2.1	0.9
Hemiptera	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Megaloptera	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Trichoptera	12.56	44.73	13.8	35.15	85.79	20.01	25.05	11.82	48.79	33.1	11.2	85.8	22.7
Lepidoptera	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Coleoptera	0.94	4.04	4.27	4.88	0.29	28	44.72	43.85	4.85	15.1	0.0	44.7	17.4
Misc. Diptera	0.79	1.78	1.32	2.85	1.03	7.72	1.08	2.81	10.43	3.3	0.8	10.4	3.2
Chironomidae	38.33	14.53	9.86	38.4	1.18	24.02	7.92	20.26	10.19	18.3	1.5	38.3	12.4
TOTAL TAXA RICHNESS	24	31	39	40	25	41	34	34	38	34	24	41	5.9
EPT RICHNESS	7	17	21	21	11	21	16	16	14	16	7	21	4.5
RICHNESS BY GROUP													
Misc. Taxa	8	4	3	3	5	2	3	4	7	4	2	8	1.9
Odonata	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Ephemeroptera	3	8	9	9	4	9	4	4	4	6	2	9	2.5
Plecoptera	0	0	4	4	1	1	5	3	1	2	0	5	1.8
Hemiptera	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Megaloptera	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Trichoptera	4	9	8	8	6	11	7	9	9	8	3	11	1.9
Lepidoptera	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Coleoptera	1	1	3	2	1	3	2	1	2	2	0	3	0.8
Misc. Diptera	2	2	3	7	4	4	3	3	5	4	2	7	1.5
Chironomidae	6	7	9	11	4	11	10	10	10	9	1	11	2.3
RATIOS TAX. GROUP													
ABUNDANCES													
EPT/Chironomidae	0.84	5.31	2.67	1.34	81.5	1.63	4.21	1.27	5.98	11.64	1.27	81.50	24.8
Hydropsy./Trichoptera	0	0	0.3	0.9	0	0.25	0.04	0.11	0.36	0.22	0.00	0.90	0.3
Baetidae/Ephemeroptera	0.98	0.42	0.18	0.22	0.27	0.33	0.3	0.48	0.84	0.45	0.18	0.98	0.3

Spring and Special Creeks cont.

METRIC	ARMS	BENH	BH34	BHFT	BIGS	ELKC	ODE1	ODE2	BIGO	Mean	Min	Max	STDEV
FFG % CONTRIBUTION													
Predator	0.94	2.1	1.98	3.65	0.44	8.14	1.92	3.6	2.42	2.8	0.3	8.1	2.1
Parasite	0.16	0	0	1.42	0	0	0	0.51	0	0.2	0.0	1.4	0.4
Collector-gatherer	66.35	40.37	13.92	38.41	12.93	42.37	22.55	28.71	33.24	33.2	13.9	66.4	15.6
Collector-filterer	1.1	0.16	64.56	33.33	0.44	8.14	2.76	6.4	30.33	16.4	0.4	64.6	20.8
Macrophyte-herbivore	0	0	0.11	0	5.28	0.14	0	0	0.24	0.6	0.0	10.2	1.6
Piercer-herbivore	11.31	1.45	0	5.08	0	0	0	0	4.13	2.4	0.0	11.3	3.6
Scraper	0.31	44.9	14.12	9.34	1.76	27.59	61.14	48.73	11.65	24.4	0.0	61.1	21.0
Shredder	0	0	0.44	0.2	51.03	0.14	0	0	1.94	6.0	0.0	51.8	15.9
Xylophage	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Omnivore	19.64	10.98	4.94	8.53	28.16	12.97	11.15	10.1	15.3	13.5	4.9	28.2	6.5
Unknown	0.16	0	0	0	0	0.56	0.48	2.05	0.73	0.4	0.0	2.1	0.6
RATIOS FFG ABUN.													
SC/CF	0.29	278	0.22	0.28	4	3.36	22.17	7.6	0.38	35.1	0.0	278.0	86.1
SC/(SC+CF)	0.22	1	0.18	0.22	0.8	0.77	0.96	0.88	0.28	0.6	0.0	1.0	0.3
SH/Total organisms	0	0	0.004	0.002	0.51	0.001	0	0	0.019	0.1	0.0	0.5	0.2
% CONTRIBUTION													
Dominat taxa (1st)	19.32	29.24	57.99	30.28	50.59	22.9	44.48	43.85	17.72	35.2	17.7	58.0	13.7
Dominant taxa (5)	78.94	64.78	74.85	66.28	92.53	48.15	76.6	63.59	51.45	68.6	48.2	78.9	13.1
Dominant taxa (10)	93.38	85.61	85.58	80.88	96.35	65.8	89.8	78.71	73.78	83.3	65.8	99.1	9.1
SAPROBIC INDICES													
Hilsenhoff Biotic Index	5.73	2.87	3.42	4.55	1.31	4.06	3.81	4.4	4.44	3.8	1.3	5.7	1.2
BCI: CTQa	89.04	70.13	68.55	76.68	71.36	70.1	72.82	73.18	80.32	74.7	68.6	89.0	6.1
BCI:CTQd	132	111	129	137	105	125	130	144	144	128.6	111.0	144.0	12.6
DIVERSITY MEASURES													
Shannon H (loge)	2.26	2.52	1.96	2.57	1.51	3.01	2.17	2.42	2.96	2.38	1.51	3.01	0.4
Shannon H (log2)	3.26	3.63	2.83	3.71	2.18	4.34	3.13	3.5	4.26	3.43	2.18	4.34	0.6
Evenness	0.71	0.73	0.54	0.7	0.47	0.81	0.62	0.69	0.81	0.68	0.47	0.81	0.1
Brillouin H	2.24	2.49	1.91	2.55	1.5	2.95	2.13	2.34	2.87	2.33	1.5	2.95	0.4
Simpson D	0.14	0.13	0.35	0.15	0.34	0.08	0.23	0.21	0.07	0.19	0.07	0.34	0.1
VOLTINISM (% CONTR.)													
Multivoltine	55.77	22.17	9.9	42.07	3.34	23.48	7.64	20.51	24.27	23.2	3.3	55.8	15.8
Univoltine	42.18	70.32	54.32	51.73	68	37.62	36.9	29.23	59.83	50.0	29.2	84.5	13.6
Semivoltine	2.04	7.51	35.78	6.2	28.67	38.9	55.46	50.26	15.9	26.7	2.0	55.5	18.7

Table 7

MONTANE REFERENCE SITES
Potential metrics and scoring criteria for RBP III-Macroinvertebrates.

	REFERENCE				SCORING				
METRIC	Mean	Min.	Max.	STD	6	4	2	0	
Total Taxa Richness	34	14	58	10.3	>80%	:60-80%	:40-60%	<40%	A
EPT Richness	22	11	35	6.2	>90%	:80-90%	:70-80%	<70%	A
Baetidae/Ephemeroptera	0.2	0	0.7	0.2	>75%	:50-75%	:25-50%	<25%	B
% Chironomidae	9.1	1	24.4	7.5					B
% Collector-gatherer	35.8	15.3	74.4	16.3	>80%	:60-80%	:40-60%	<40%	B
% Collector-filterer	1.9	0	8.8	2.5					B
% Scraper	36.2	8.4	65	16.6	>80%	:60-80%	:40-60%	<40%	A
% Shredder	8.4	0	34.3	9.7					A
SC/(SC+CF)	0.9	0.8	1	0.1					A
% Dominant Taxa	28.9	10.9	55.6	11	<30%	:30-40%	:40-50%	>50%	C
Brillouin Index	2.43	1.64	3.24	0.42	>90%	:80-90%	:70-80%	<70%	A
Hilsenhoff Biotic Index	2.5	1.1	4.6	1	>85%	:70-85%	:50-70%	<50%	B
% Multivoltine	19.3	7.2	46.2	11.2	>80%	:60-80%	:40-60%	<40%	B
% Semivoltine	9.6	1.8	39.5	10.4					A
Community Loss Index	0.58	0.172	1.643	0.337	<0.6	:0.6-1.5	:1.5-4.0	>4.0	D
QSI-taxa	0.38	0.131	0.568	0.138	>0.4	:0.3-0.4	:0.2-0.3	<0.2	D
QSI-FFG	0.727	0.566	0.878	0.179	>0.75	:0.65-0.75	:0.55-0.65	<0.55	D
DIC-5	2.4	0	5	1.6	:3-5	2	1	0	D

A= Score is ratio of study site to reference site X 100.
B= Score is ratio of reference site to study site X 100.
C= Scoring criteria evaluate actual percent contribution, not percent comparability to the reference site.
D= Range of values obtained. A comparison to the reference station is incorporated in these indices.

Table 8

MONTANE REFERENCE SITES

Potential metrics and scoring criteria for RBP III-Macroinvertebrates.

Comparison of individual sites versus the reference community (% for A & B)

METRIC	SEYM	ROAR	STON	EFBU	SFFL	WALD	NFTE	SFSU	LFRO	FOUR	STI1
Total Taxa Richness	171	109	144	79	41	94	74	126	94	132	106
EPT Richness	159	100	155	91	50	109	95	123	82	136	118
Baetidae/Ephemeroptera	133.3	200	333.3	166.7	200	51.28	181.8	333.3	62.5	1000	250
% Chironomidae	384	34.56	88.09	166.7	901	538.5	2395	67.21	50.72	210.6	161.9
% Collector-gatherer	112.6	143.1	229.3	138.9	85.83	94.43	174.6	85.87	91.05	234	150.9
% Collector-filterer	40.86	21.64	904.8	243.6	UN	UN	1000	863.6	275.4	351.9	1056
% Scraper	61.41	126	108.4	157.5	137.5	23.31	156.6	72.38	87.65	142.3	179.6
% Shredder	80	94.05	231	68.21	0	408.2	184.6	65	98.57	120.1	29.29
SC/(SC+CF)	92.22	93.33	110	110	111.1	111.1	111.1	110	108.9	110	111.1
% Dominant Taxa	10.85	23.68	11.18	25.26	34.67	20.77	44.25	23.14	28.97	32.61	34.62
Brillouin Index	133.3	111.9	123.5	93	68.72	101.2	82.3	116.5	105.3	111.1	92.18
Hilsenhoff Biotic Index	84.18	92.25	152.4	195.3	215.5	115.7	223.2	167.8	63.29	179.9	120.2
% Multivoltine	76.01	78.94	164.8	157.7	269.6	111	285.9	146.7	69.1	231.7	204.2
% Semivoltine	119.8	31.98	73.65	65.1	88.96	50.31	18.96	103.4	86.25	91.98	47.6
Community Loss Index	0.172	0.378	0.245	0.63	1.643	0.563	0.72	0.326	0.531	0.289	0.417
QSI-taxa	0.469	0.373	0.563	0.546	0.414	0.43	0.507	0.496	0.397	0.407	0.449
QSI-FFG	0.827	0.878	0.783	0.828	0.82	0.59	0.777	0.795	0.857	0.792	0.754
DIC-5	3	1	2	4	4	2	4	3	3	3	5

Scores of Selected Metrics

METRIC	SEYM	ROAR	STON	EFBU	SFFL	WALD	NFTE	SFSU	LFRO	FOUR	STI1
Total Taxa Richness	6	6	6	4	2	6	4	6	6	6	6
EPT Richness	6	6	6	6	0	6	6	6	4	6	6
Baetidae/Ephemeroptera	6	6	6	6	6	4	6	6	4	6	6
% Collector-gatherer	6	6	6	6	6	6	6	6	6	6	6
% Scraper	4	6	6	6	6	0	6	4	6	6	6
% Dominant Taxa	6	6	6	6	4	6	2	6	6	4	4
Brillouin Index	6	6	6	6	0	6	4	6	6	6	6
Hilsenhoff Biotic Index	4	6	6	6	6	6	6	6	2	6	6
% Multivoltine	4	4	6	6	6	6	6	6	4	6	6
Community Loss Index	6	6	6	4	4	6	4	6	6	6	6
QSI-taxa	6	4	6	6	6	6	6	6	4	6	6
QSI-FFG	6	6	6	6	6	2	6	6	6	6	6
DIC-5	6	2	4	6	6	4	6	6	6	6	6

Bioassessment

Total Metric Score	72	70	76	74	58	64	68	76	66	76	76
Total Habitat Score	115	121	123	111	102	92	88	109	114	112	113
% Reference-Metric Score	100	97	106	103	81	89	94	106	92	106	106
Bioassessment	NON	NON	NON	NON	SLI	NON	NON	NON	NON	NON	NON

NON= Nonimpaired SLI= Slightly Impaired MOD= Moderately Impaired
SEV= Severely Impaired.

MONTANE REFERENCE SITES

Potential metrics and scoring criteria for RBP III-Macroinvertebrates.

Comparison of individual sites versus the reference community (% for A & B)

METRIC	STI2	BOUL	PINE	CALF	CRO1	CRO2	TEND	BIGC	WGAL	WISC	
Total Taxa Richness	112	88	100	129	50	76	94	85	76	106	A
EPT Richness	109	105	77	114	59	73	91	91	68	82	A
Baetidae/Ephemeroptera	142.9	95.24	UN	166.7	28.57	31.75	66.67	55.56	42.55	UN	B
% Chironomidae	75.64	379.2	55.59	98.81	464.3	128.3	37.37	64.91	143.3	130.6	B
% Collector-gatherer	116.6	115.8	138.1	73.89	50.72	48.11	121.7	58.65	133.4	176.1	B
% Collector-filterer	119.5	558.8	76.92	95.96	96.94	83.7	56.21	UN	23.6	404.3	B
% Scraper	147.7	154.7	67.38	64.25	46.96	31.38	61.6	79.45	92.96	130	A
% Shredder	30.12	36.79	385.8	88.81	15.48	6.786	56.31	8.333	0	216.8	A
SC/(SC+CF)	107.8	110	101.1	102.2	100	92.22	96.67	111.1	90	110	A
% Dominant Taxa	24.37	26.12	27.47	20.39	55.56	50	22.97	28.42	32.68	42.79	C
Brillouin Index	99.59	96.3	100	121	67.49	72.02	110.7	95.06	97.53	88.07	A
Hilsenhoff Biotic Index	87.11	114.7	114.7	77.16	56.69	54.47	94.7	69.44	108.2	170.1	B
% Multivoltine	111.9	126.2	93.69	188.3	41.74	43.21	91.43	59.31	141.3	165	B
% Semivoltine	26.35	30.42	24.06	388.3	64.69	42.92	411.8	31.04	193.1	35.73	A
Community Loss Index	0.368	0.467	0.5	0.364	1.294	0.769	0.531	0.552	0.846	0.583	D
QSI-taxa	0.456	0.568	0.242	0.262	0.313	0.308	0.277	0.437	0.314	0.131	D
QSI-FFG	0.849	0.836	0.696	0.745	0.608	0.566	0.737	0.713	0.759	0.827	D
DIC-5	5	4	0	1	2	2	0	3	2	0	D

Scores of Selected Metrics

METRIC	STI2	BOUL	PINE	CALF	CRO1	CRO2	TEND	BIGC	WGAL	WISC	REF
Total Taxa Richness	6	6	6	6	2	4	6	6	4	6	6
EPT Richness	6	6	2	6	0	2	6	6	0	4	6
Baetidae/Ephemeroptera	6	6	6	6	2	2	4	4	2	6	6
% Collector-gatherer	6	6	6	4	4	2	6	4	6	6	6
% Scraper	6	6	4	4	2	0	4	4	6	6	6
% Dominant Taxa	6	6	6	6	0	0	6	6	4	2	6
Brillouin Index	6	6	6	6	0	2	6	6	6	4	6
Hilsenhoff Biotic Index	6	6	6	4	2	2	6	2	6	6	6
% Multivoltine	6	6	6	6	2	2	6	2	6	6	6
Community Loss Index	6	6	6	6	4	4	6	6	4	6	6
QSI-taxa	6	6	2	2	4	4	2	6	4	0	4
QSI-FFG	6	6	4	4	2	2	4	4	6	6	4
DIC-5	6	6	0	2	4	4	0	6	4	0	4

Bioassessment

Total Metric Score	78	78	60	62	28	30	62	62	58	58	72
Total Habitat Score	113	105	121	104	104	104	107	121	96	97	
% Reference-Metric Score	108	108	83	86	39	42	86	86	81	81	
Bioassessment	NON	NON	NON	NON	MOD	MOD	NON	NON	SLI	SLI	

NON= Nonimpaired SLI= Slightly Impaired MOD= Moderately Impaired
SEV= Severely Impaired.

Table 9

PLAINS REFERENCE SITES

Potential metrics and scoring criteria for RBP III-Macroinvertebrates.

	REFERENCE				SCORING				
METRIC	Mean	Min.	Max.	STD	6	4	2	0	
Total Taxa Richness	29	11	47	9.3	>80%	:60-80%	:40-60%	<40%	A
EPT Richness	6	1	11	3.4	>90%	:80-90%	:70-80%	<70%	A
EPT/Chironomidae	1.43	0.16	3.3	1.1	>75%	:50-75%	:25-50%	<25%	A
EPT % Contribution	20.4	7.12	54.78	14.9	>80%	:60-80%	:40-60%	<40%	A
% Collector-gatherer	47.7	7.3	81.5	20.7	>80%	:60-80%	:40-60%	<40%	B
% Dominant Taxa	34.8	13.3	74.3	16.3	<30%	:30-40%	:40-50%	>50%	C
Brillouin Index	2.2	1.2	2.9	0.4	>90%	:80-90%	:70-80%	<70%	A
Hilsenhoff Biotic Index	7	6.1	7.8	0.7	>85%	:70-85%	:50-70%	<50%	B
% Multivoltine	24.7	9.6	41.5	9.2	>80%	:60-80%	:40-60%	<40%	B
Community Loss Index	0.659	0.244	2	0.459	<0.6	:0.6-1.5	:1.5-4.0	>4.0	D
QSI-taxa	0.335	0.062	0.559	0.146	>0.4	:0.3-0.4	:0.2-0.3	<0.2	D
QSI-FFG	0.678	0.331	0.919	0.167	>0.75	:0.65-0.75	:0.55-0.65	<0.55	D
DIC-5	1.5	0	3	0.9	:3-5	2	1	0	D

A= Score is ratio of study site to reference site X 100.

B= Score is ratio of reference site to study site X 100.

C= Scoring criteria evaluate actual percent contribution, not percent comparability to the reference site.

D= Range of values obtained. A comparison to the reference station is incorporated in these indices.

Table 10

PLAINS REFERENCE SITES

Potential metrics and scoring criteria for RBP III-Macroinvertebrates.

Comparison of individual sites versus the reference community (% for A & B)

METRIC	TONG	BATA	BATB	BOXE	HANG	LARB	OFAL	POPA	POPB	REDW	ROCK	TULE	WILL	
Total Taxa Richness	93.1	162.1	93.1	93.1	113.8	96.55	58.62	89.66	134.5	37.93	127.6	89.66	120.7	A
EPT Richness	200	183.3	150	166.7	50	83.33	33.33	100	183.3	16.67	66.67	66.67	83.33	A
EPT/Chironomidae	967.8	45.45	171.3	125.2	230.8	215.4	38.46	128.7	98.6	11.19	10.49	27.97	95.8	A
EPT % Contribution	217.1	98.77	210.8	268.5	115.1	55.15	62.79	55.83	122.4	37.7	38.28	34.9	98.82	A
% Collector-gatherer	55.22	71.57	121	123.8	58.54	131.9	156.4	651.6	157.6	93.93	96.05	65.5	68.89	B
% Dominant Taxa	33.33	20.29	32.97	25.16	46.96	28.57	50	74.27	37.13	30.77	13.29	15.83	41.94	C
Brillouin Index	93.64	122.7	104.5	112.7	90	105.9	84.09	53.18	110.5	86.36	133.6	115.5	92.73	A
Hilsenhoff Biotic Index	162.8	104.2	109	114.9	92.23	91.03	89.51	113.5	116.5	89.4	100	93.83	92.35	B
% Multivoltine	94.35	78.81	88.34	82.06	178.7	197	109.5	257	104.6	69.05	59.59	122	91.28	B
Community Loss Index	0.852	0.244	0.593	0.593	0.364	0.607	1.176	0.615	0.308	2	0.351	0.577	0.286	D
QSI-taxa	0.062	0.506	0.35	0.277	0.559	0.362	0.218	0.143	0.353	0.205	0.34	0.507	0.476	D
QSI-FFG	0.77	0.919	0.717	0.665	0.784	0.532	0.425	0.331	0.626	0.622	0.721	0.79	0.918	D
DIC-5	0	3	2	1	2	1	1	0	2	1	1	2	3	D

Scores of Selected Metrics

METRIC	TONG	BATA	BATB	BOXE	HANG	LARB	OFAL	POPA	POPB	REDW	ROCK	TULE	WILL	REF
Total Taxa Richness	6	6	6	6	6	6	2	6	6	0	6	6	6	6
EPT Richness	6	6	6	6	0	4	0	6	6	0	0	0	4	6
EPT/Chironomidae	6	2	6	6	6	6	2	6	6	0	0	2	6	6
EPT % Contribution	6	6	6	6	6	2	4	2	6	0	0	0	6	6
% Collector-gatherer	2	4	6	6	2	6	6	6	6	6	6	4	4	6
% Dominant Taxa	4	6	4	6	2	6	0	0	4	4	6	6	2	4
Brillouin Index	6	6	6	6	6	6	4	0	6	4	6	6	6	6
Hilsenhoff Biotic Index	6	6	6	6	6	6	6	6	6	6	6	6	6	6
% Multivoltine	6	4	6	6	6	6	6	6	6	4	4	6	6	6
Community Loss Index	4	6	6	6	6	4	4	4	6	2	6	6	6	4
QSI-taxa	0	6	4	2	6	4	2	0	4	2	4	6	6	4
QSI-FFG	6	6	4	4	6	0	0	0	2	2	4	6	6	4
DIC-5	0	6	4	2	4	2	2	0	4	2	2	4	6	4

Bioassessment

Total Metric Score	58	70	70	68	62	58	38	42	68	32	50	58	70	68
Total Habitat Score	106	69	69	78	60	55	72	90	90	56	68	74	47	
% Reference-Metric Score	85.29	102.9	102.9	100	91.18	85.29	55.88	61.76	100	47.06	73.53	85.29	102.9	
Bioassessment	NON	NON	NON	NON	NON	NON	SLI	SLI	NON	MOD	SLI	NON	NON	

NON= Nonimpaired SLI= Slightly Impaired MOD= Moderately Impaired
SEV= Severely Impaired.

Table 11

SPRING CREEK REFERENCE SITES

Potential metrics and scoring criteria for RBP III-Macroinvertebrates.

	REFERENCE				SCORING				
METRIC	Mean	Min.	Max.	STD	6	4	2	0	
Total Taxa Richness	34	24	41	5.9	>80%	:60-80%	:40-60%	<40%	A
EPT Richness	16	7	21	4.5	>90%	:80-90%	:70-80%	<70%	A
Baetidae/Ephemeroptera	0.45	0.18	0.98	0.3	>75%	:50-75%	:25-50%	<25%	B
% Chironomidae	18.3	1.5	38.3	12.4					B
% Collector-gatherer	33.2	13.9	66.4	15.6	>80%	:60-80%	:40-60%	<40%	B
% Collector-filterer	16.4	0.4	64.6	20.8					B
% Scraper	24.4	0	61.1	21	>80%	:60-80%	:40-60%	<40%	A
% Shredder	6	0	51.8	15.9					A
SC/(SC+CF)	0.6	0	1	0.3					A
% Dominant Taxa	35.2	17.7	58	13.7	<30%	:30-40%	:40-50%	>50%	C
Brillouin Index	2.33	1.5	2.95	0.4	>90%	:80-90%	:70-80%	<70%	A
Hilsenhoff Biotic Index	3.8	1.3	5.7	1.2	>85%	:70-85%	:50-70%	<50%	B
% Multivoltine	23.2	3.3	55.8	15.8	>80%	:60-80%	:40-60%	<40%	B
% Semivoltine	26.7	2	55.5	18.7					A
Community Loss Index	0.536	0.268	0.88	0.197	<0.6	:0.6-1.5	:1.5-4.0	>4.0	D
QSI-taxa	0.294	0.187	0.423	0.073	>0.4	:0.3-0.4	:0.2-0.3	<0.2	D
QSI-FFG	0.608	0.488	0.785	0.097	>0.75	:0.65-0.75	:0.55-0.65	<0.55	D
DIC-5	1.6	1	3	0.7	:3-5	2	1	0	D

A= Score is ratio of study site to reference site X 100.

B= Score is ratio of reference site to study site X 100.

C= Scoring criteria evaluate actual percent contribution, not percent comparability to the reference site.

D= Range of values obtained. A comparison to the reference station is incorporated in these indices.

Table 12

SPRING CREEK REFERENCE SITES

Potential metrics and scoring criteria for RBP III-Macroinvertebrates.

Summary of comparison of individual sites versus the reference community.

METRIC	ARMS	BENH	BH34	BHFT	BIGS	ELKC	ODE1	ODE2	BIGO	
Total Taxa Richness	70.59	91.18	114.7	117.6	73.53	120.6	100	100	111.8	A
EPT Richness	43.75	106.3	131.3	131.3	68.75	131.3	100	100	87.5	A
Baetidae/Ephemeroptera	45.92	107.1	250	204.5	166.7	136.4	150	93.75	53.57	B
% Chironomidae	47.74	125.9	185.6	47.66	1551	76.19	231.1	90.33	179.6	B
% Collector-gatherer	50.04	82.24	238.5	86.44	256.8	78.36	147.2	115.6	99.88	B
% Collector-filterer	1491	10250	25.4	49.2	3727	201.5	594.2	256.2	54.07	B
% Scraper	1.27	184	57.87	38.28	7.213	113.1	250.6	199.7	47.75	A
% Shredder	0	0	7.333	3.333	850.5	2.333	0	0	32.33	A
SC/(SC+CF)	36.67	166.7	30	36.67	133.3	128.3	160	146.7	46.67	A
% Dominant Taxa	19.32	29.24	57.99	30.28	50.59	22.9	44.48	43.85	43.85	C
Brillouin Index	96.14	106.9	81.97	109.4	64.38	126.6	91.42	100.4	123.2	A
Hilsenhoff Biotic Index	66.32	132.4	111.1	83.52	290.1	93.6	99.74	86.36	85.59	B
% Multivoltine	41.6	104.6	234.3	55.15	694.6	98.81	303.7	113.1	95.59	B
% Semivoltine	7.64	28.13	134	23.22	107.4	145.7	207.7	188.2	59.55	A
Community Loss Index	0.875	0.484	0.436	0.4	0.88	0.268	0.529	0.529	0.421	D
QSI-taxa	0.237	0.361	0.247	0.363	0.187	0.423	0.224	0.285	0.32	D
QSI-FFG	0.526	0.617	0.491	0.674	0.488	0.705	0.548	0.635	0.785	D
DIC-5	1	1	1	1	2	3	1	2	2	D

Scores of Selected Metrics

METRIC	ARMS	BENH	BH34	BHFT	BIGS	ELKC	ODE1	ODE2	BIGO	REF
Total Taxa Richness	4	6	6	6	4	6	6	6	6	6
EPT Richness	0	6	6	6	0	6	6	6	4	6
Baetidae/Ephemeroptera	2	6	6	6	6	6	6	6	4	6
% Collector-gatherer	2	6	6	6	6	4	6	6	6	6
% Scraper	0	6	2	0	0	6	6	6	2	6
% Dominant Taxa	6	6	0	4	0	6	2	2	2	4
Brillouin Index	6	6	4	6	0	6	6	6	6	6
Hilsenhoff Biotic Index	2	6	6	4	6	6	6	6	6	6
% Multivoltine	2	6	6	2	6	6	6	6	6	6
Community Loss Index	4	6	6	6	4	6	6	6	6	6
QSI-taxa	2	4	2	4	0	6	2	2	2	2
QSI-FFG	0	2	0	4	0	4	0	2	6	4
DIC-5	2	2	2	2	4	6	2	4	4	4

Bioassessment

Total Metric Score	32	68	52	56	36	74	60	64	60	68
Total Habitat Score	130	114	126	120	128	98	104	104	114	
% Reference	47.06	100	76.47	82.35	52.94	108.8	88.24	94.12	88.24	
Bioassessment	SEV	NON	SLI	SLI	SLI	NON	NON	NON	NON	

NON= Nonimpaired SLI= Slightly Impaired MOD= Moderately Impaired
SEV= Severely Impaired.

Table 13

Summary of Comparison between individual sites and the Montane Reference Community-1990 Version.

	CLI	JAC	CTI	PPSI	QSI-tax	QSI-ffg	DIC 5	DIC 10
Northern Rockies, Granitics								
Wisconsin Creek	0.583	0.228	0.361	0.001	0.131	0.827	0	1
Seymour Creek	0.172	0.353	0.414	0.009	0.469	0.785	3	3
Roaring Lion Creek	0.378	0.392	0.541	0.006	0.373	0.878	1	2
N. Rockies, Non-Granitics, West Side								
Stony Creek	0.245	0.361	0.449	0.014	0.563	0.783	2	6
E.F. Bull River	0.630	0.386	0.500	0.020	0.546	0.828	4	6
S.F. Flathead River	1.643	0.297	0.324	0.019	0.414	0.820	4	5
N. Rockies, Non-Granitics, East Side								
Waldron Creek	0.563	0.320	0.471	0.009	0.430	0.590	2	6
N.F. Teton River	0.720	0.372	0.471	0.016	0.507	0.777	4	7
S.F. Sun River	0.326	0.351	0.465	0.008	0.496	0.795	3	5
Middle Rockies, Absaroka-Beartooth Range								
Lake Fork Rock Creek	0.531	0.347	0.500	0.009	0.397	0.857	3	3
Fourmile Creek	0.289	0.362	0.467	0.009	0.407	0.792	3	3
W.F. Stillwater River 1	0.417	0.373	0.528	0.013	0.449	0.754	5	5
W.F. Stillwater 2	0.368	0.385	0.526	0.012	0.456	0.849	5	5
Boulder River	0.467	0.455	0.588	0.016	0.568	0.836	4	6
Middle Rockies, Other Geology								
Pine Creek	0.500	0.333	0.500	0.003	0.242	0.696	0	1
Calf Creek	0.364	0.300	0.409	0.004	0.262	0.745	1	1
Crooked Creek 1	1.294	0.308	0.353	0.013	0.313	0.608	2	3
Crooked Creek 2	0.769	0.304	0.412	0.011	0.308	0.566	2	2
Tenderfoot Creek	0.531	0.347	0.500	0.002	0.277	0.737	0	2
Big Creek	0.552	0.400	0.529	0.018	0.437	0.713	3	4
W. Gallatin River	0.846	0.250	0.353	0.007	0.314	0.759	2	3

Average	0.580	0.344	0.460	0.010	0.380	0.727	2.4	3.8
Standard deviation	0.337	0.051	0.070	0.005	0.138	0.179	1.6	1.8

CLI	Community loss index
JAC	Jaccard similarity
CTI	Common taxa index
PPSI	Pinkham-Pearson similarity index
QSI-tax	Quantitative similarity index for taxa
QSI-ffg	Quantitative similarity index for functional feeding groups
DIC 5	Dominants in common- 5
DIC 10	Dominants in common-10

Table 14

Summary of Comparison between individual sites and the Plains Reference Community-1990 Version

	CLI	JAC	CTI	PPSI	QSI-tax	QSI-ffg	DIC 5	DIC 10
Northern Montana Glaciated Plains								
Rock Creek	0.351	0.320	0.432	0.006	0.340	0.721	1	4
Battle Creek 1	0.244	0.373	0.463	0.020	0.506	0.919	3	5
Battle Creek 2	0.593	0.302	0.448	0.006	0.350	0.717	2	4
Willow Creek	0.286	0.422	0.543	0.007	0.476	0.918	3	4
Northwestern Glaciated Plains								
Tule Creek	0.577	0.341	0.483	0.015	0.507	0.790	2	6
W.F. Poplar River A	0.615	0.310	0.448	0.002	0.143	0.331	0	5
W.F. Poplar River B	0.308	0.333	0.436	0.019	0.353	0.626	2	5
Redwater River	2.000	0.212	0.241	0.006	0.205	0.622	1	2
Northwestern Great Plains								
Larb Creek	0.607	0.267	0.414	0.007	0.362	0.532	1	6
Boxelder Creek	0.593	0.302	0.448	0.002	0.277	0.665	1	3
Hanging Woman Creek	0.364	0.378	0.515	0.008	0.559	0.784	2	6
O'Fallon Creek	1.176	0.243	0.310	0.003	0.218	0.425	1	3
Tongue River	0.852	0.120	0.207	0.000	0.062	0.770	0	2

Average	0.659	0.302	0.414	0.008	0.335	0.678	1.5	4.2
Standard deviation	0.459	0.075	0.097	0.006	0.146	0.167	0.9	1.4

CLI	Community loss index
JAC	Jaccard similarity
CTI	Common taxa index
PPSI	Pinkham-Pearson similarity index
QSI-tax	Quantitative similarity index for taxa
QSI-ffg	Quantitative similarity index for functional feeding groups
DIC 5	Dominants in common-5
DIC10	Dominants in common-10

Table 15

Summary of Comparison between individual sites and the Spring Reference Community-1990 Version.

	CLI	JAC	CTI	PPSI	QSI-tax	QSI-ffg	DIC 5	DIC 10
Armstrong Spring	0.875	0.289	0.382	0.004	0.237	0.526	1	2
Ben Hart Spring Creek	0.484	0.413	0.559	0.006	0.361	0.617	1	4
Big Hole River/hwy 34	0.436	0.304	0.436	0.004	0.247	0.491	1	3
Big Hole River/Fish trap	0.400	0.321	0.450	0.006	0.362	0.674	1	5
Big Otter Creek at Bodme	0.421	0.333	0.474	0.009	0.32	0.785	2	2
Big Spring/St. Hatch.	0.88	0.255	0.353	0.003	0.187	0.488	2	3
Elk Creek	0.268	0.442	0.561	0.007	0.423	0.705	3	6
Odell Creek 1	0.529	0.308	0.471	0.005	0.224	0.548	1	2
Odell Creek 2	0.529	0.308	0.471	0.009	0.285	0.635	2	2

Average	0.536	0.330	0.462	0.006	0.294	0.608	1.556	3.222
Standard deviation	0.197	0.056	0.066	0.002	0.073	0.097	0.685	1.397

CLI= Community loss index
JAC= Jaccard similarity
CTI= Common taxa index
PPSI= Pinkham-Pearson similarity index
QSI-taxa= Quantitative similarity index for taxa
QSI-ffg= Quantitative similarity index for functional feeding groups
DIC 5= Dominants in common-5
DIC 10= Dominants in common-10

Table 16

Habitat Assessment Summary-Montane Reference Streams, 1990

File: MONHASUM.WQ!

Habitat parameter	1	2	3	4	5	6	7	8	9	Total
Maximum possible score	20	20	20	15	15	15	10	10	10	135
Northern Rockies, Granitics										
Wisconsin Creek	15	16	14	12	7	11	8	8	6	97
Seymour Creek	20	18	16	11	11	10	9	10	10	115
Roaring Lion Creek	20	20	15	14	12	13	9	10	8	121
N. Rockies, Non-Granitics, West Side										
Stony Creek	20	20	18	11	11	13	11	9	10	123
E.F. Bull River	16	19	15	11	9	15	8	8	10	111
S.F. Flathead River	14	20	12	8	3	12	8	9	16	102
N. Rockies, Non-Granitics, East Side										
Waldron Creek	16	10	18	9	9	11	5	6	8	92
N.F. Teton River	20	18	10	4	8	7	5	7	9	88
S.F. Sun River	20	20	16	10	11	11	8	8	5	109
Middle Rockies, Absaroka-Beartooth Range										
Lake Fork Rock Creek	20	14	14	15	15	7	10	10	9	114
Fourmile Creek	20	16	12	15	15	7	10	10	7	112
W.F. Stillwater River	20	13	18	11	11	15	8	10	7	113
Boulder River	20	10	20	7	11	15	7	9	6	105
Middle Rockies, Other Geology										
Pine Creek	16	18	20	15	9	15	9	10	9	121
Calf Creek	20	11	18	15	11	7	7	7	8	104
Crooked Creek	18	5	18	12	15	13	5	9	9	104
Tenderfoot Creek	20	18	12	12	12	10	8	9	6	107
Big Creek	20	19	16	15	15	10	9	9	8	121
W. Gallatin River	20	13	12	11	10	7	5	9	9	96

Average	18.7	15.7	15.5	11.5	10.8	11.0	7.8	8.8	8.4	108.2
Standard deviation	2.1	4.2	2.9	3.0	3.0	2.9	1.8	1.2	2.3	9.9

Scoring Criteria: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

1	Bottom substrate/available cover
2	Embeddedness
3	Flow
4	Channel alteration
5	Bottom scouring and deposition
6	Pool/riffle, run/bend ratio
7	Bank stability
8	Bank vegetation stability
9	Streamside cover

Table 17

Habitat Assessment Summary-Plains Streams, 1990

File: PLAHASUM.WQ1

Habitat Parameter	1	2	3	4	5	6	7	8	9	Total
Maximum possible score	20	20	20	15	15	15	10	10	10	135
Northern Montana Glaciated Plains										
Rock Creek	15	2	1	12	8	8	8	9	5	68
Battle Creek	15	2	1	13	8	9	7	9	5	69
Willow Creek	1	1	1	12	2	8	8	9	5	47
Northwestern Glaciated Plains										
Tule Creek	12	2	1	13	11	8	8	10	9	74
W.F. Poplar River	17	15	10	13	8	9	6	8	4	90
Redwater River	17	3	1	8	8	6	3	6	4	56
Northwestern Great Plains										
Larb Creek	12	7	2	1	5	9	3	7	9	55
Boxelder Creek	16	10	5	12	10	6	7	7	5	78
Hanging Woman Creek	3	2	2	10	10	9	9	9	6	60
O'Fallon Creek	13	7	3	13	10	11	4	6	5	72
Tongue River	17	12	16	13	13	11	7	9	8	106

Average	12.5	5.7	3.9	10.9	8.5	8.5	6.4	8.1	5.9	70.5
Standard deviation	5.3	4.6	4.6	3.5	2.8	1.6	2.0	1.3	1.8	16.0

Scoring criteria: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

1 Bottom substrate/available cover
2 Embeddedness
3 Flow
4 Channel alteration
5 Bottom scouring and deposition
6 Pool/riffle, run/bend ratio
7 Bank stability
8 Bank vegetation stability
9 Streamside cover

Table 18

Habitat Assessment Summary-Spring and Special Creeks, 1990

File: SPRHASUM.WQ1

Habitat Parameter	1	2	3	4	5	6	7	8	9	Total
Maximum possible score	20	20	20	15	15	15	10	10	10	135
Spring Creeks										
Ben Hart Spring Creek	20	18	15	13	13	11	9	10	5	114
Armstrong Spring Creek	20	18	20	15	15	14	9	10	9	130
Odell Spring Creek	18	18	17	8	8	11	7	9	8	104
Special Creeks										
Big Spring Creek	19	15	20	15	15	15	10	10	9	128
Big Hole River at hwy 34	20	20	16	15	15	13	10	10	7	126
Big Hole River at Fishtrap	20	20	15	15	15	11	9	9	6	120
Elk Creek	11	15	20	11	11	10	3	10	7	98

Average	18.3	17.7	17.6	13.1	13.1	12.1	8.1	9.7	7.3	117.1
Standard deviation	3.1	1.9	2.2	2.5	2.5	1.7	2.3	0.5	1.4	11.5

Scoring criteria: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

1 Bottom substrate/available cover
2 Embeddedness
3 Flow
4 Channel alteration
5 Bottom scouring and deposition
6 Pool/riffle, run/bend ratio
7 Bank stability
8 Bank vegetation stability
9 Streamside cover

Table 19

Comparison of Riffle and Macrophyte Veg. Kick Samples

Selected metrics, 1990 Reference Stream Project.
File: RIFVEG.WQ1

Plains Streams

	Battle Creek		Box Elder Creek		W.F. Poplar Rive		Redwater River	
	Riffle	Veg	Riffle	Pool	Riffle	Veg.	Riffle	Veg
Total number of taxa	41	19	27	24	39	23	11	22
Number EPT taxa	11	1	10	6	11	6	1	3
PERCENT CONTRIBUTION								
Misc. Taxa	43.55	74.6	2.24	2.1	15.93	39.1	7.69	36.84
Odonata	1.95	4.5	3.82	14.11	1.38	3.64	30.77	7.89
Ephemeroptera	11.05	2.38	38.86	7.79	17.3	22.42	7.69	2.1
Plecoptera	0	0	0	0	0	0	0	0
Hemiptera	0	0	7.01	39.37	1.97	0	4.62	0
Megaloptera	0	0	0.96	0.42	0	0	0	0
Trichoptera	9.1	0	15.92	1.68	7.66	2.72	0	0.53
Lepidoptera	0	0	0.32	0	0	0	0	0
Coleoptera	0.52	0	0.32	1.05	0.4	0	1.54	1.06
Misc. Diptera	2.86	0.79	0	0	37.72	14.24	0	1.06
Chironomidae	30.96	17.72	30.57	33.47	17.66	17.87	47.71	50.54
EPT/Chironomidae	0.65	0.13	1.79	0.28	1.41	1.41	0.16	0.05
SC/(SC+CF)	0.32	0.89	0.66	0.59	0.02	0.12	0	0
% Contribution dominant taxa	20.29	23.02	25.16	39.16	37.13	22.12	30.77	25.79
Hilsenhoff Biotic Index	6.72	7.31	6.09	7.19	6.01	5.95	7.83	7.27
Brillouin H	2.7	2.34	2.48	1.83	2.43	2.37	1.9	2.31

Plains Streams

	Rock Creek		Tule Creek		Willow Creek	
	Riffle	Veg	Riffle	Veg	Riffle	Veg
Total number of taxa	37	22	26	24	35	22
Number EPT taxa	4	2	4	2	5	2
PERCENT CONTRIBUTION						
Misc. Taxa	19.7	31.81	51.7	68.48	61.52	35.31
Odonata	5.77	10.45	12.14	3.69	0.96	0.14
Ephemeroptera	7.13	1.82	7.12	1.73	18.36	5.92
Plecoptera	0	0	0	0	0	0
Hemiptera	4.42	0	4.49	0	1.03	0.07
Megaloptera	0	0	0	0	0	0
Trichoptera	0.68	0.45	0	0	1.8	0.43
Lepidoptera	0	0	0	0	0	0
Coleoptera	1.36	0.91	6.6	3.94	0.32	0.07
Misc. Diptera	8.16	0	0.26	2.96	1.28	0.51
Chironomidae	52.77	54.53	17.69	19.23	14.69	57.54
EPT/Chironomidae	0.15	0.04	0.4	0.09	1.37	0.11
SC/(SC+CF)	0	0.1	0.09	0.73	0.17	0.06
% Contribution dominant taxa	13.29	19.55	15.83	40.39	41.94	25.13
Hilsenhoff Biotic Index	7	7.27	7.46	6.41	7.58	6.95
Brillouin H	2.94	2.28	2.54	2.15	2.04	2.31

Table 20

Comparison of Riffle and Macrophyte Veg. Kick Sample

Selected metrics, 1990 Reference Stream Project.
File: RIFVEG.WQ1

Spring Creeks

	Armstrong Sprin		Ben Hart Spring		Big Spring Cree	
	Riffle	Veg	Riffle	Veg	Riffle	Veg
Total number of taxa	24	22	31	20	25	13
Number EPT taxa	7	6	17	8	11	5
PERCENT CONTRIBUTION						
Misc. Taxa	27.71	28.63	2.42	5.2	1.92	11.4
Odonata	0	0	0	0	0	0
Ephemeroptera	19.64	49.78	32.46	42.86	9.39	10.23
Plecoptera	0	0	0	0	0.44	0
Hemiptera	0	0	0	0	0	0
Megaloptera	0	0	0	0	0	0
Trichoptera	12.56	4.54	44.73	5.85	85.79	73.38
Lepidoptera	0	0	0	0	0	0
Coleoptera	0.94	0	4.04	2.6	0.29	0
Misc. Diptera	0.79	3.87	1.78	3.25	1.03	3.5
Chironomidae	38.33	13.18	14.53	40.26	1.18	1.46
EPT/Chironomidae	0.84	4.12	5.31	1.21	81.5	57.2
SC/(SC+CF)	0.22	0	1	0.38	0.8	0
% Contribution dominant taxa	19.32	49.32	29.24	25.97	50.59	51.75
Hilsenhoff Biotic Index	5.73	6.28	2.87	5.05	1.31	2.06
Brillouin H	2.24	1.85	2.49	2.23	1.5	1.6

Table 21

Variation of metrics between replicate kick samples.

Montana: 1990 RBP Reference stream samples.

Site	1	1	2	2	3	3	4	4	5	5
Replicate	A	B	A	B	A	B	A	B	A	B
Sample I.D.	:02-1A	:02-1B	RBP 1	RBP 2	:04-1A	:04-1B	RBP1D	RBP2U	RBP 1	RBP 2
Total abundance	3076	1116	1668	780	4912	1018	569	316	306	352
EPT abundance	620	480	556	200	560	254	521	262	294	311

Total number taxa	41	27	34	34	26	39	36	38	17	26
Number EPT taxa	11	9	16	16	6	11	26	24	13	16
EPT/Chironomidae abundance	0.65	2.45	4.21	1.27	1.84	1.41	16.28	6.89	49	12.44
Hydropsychidae/Total Trichoptera	0.91	0.95	0.04	0.11	0.96	0.64	0	0.1	0.18	0.16
% Collector-gatherer	66.65	39.43	22.55	28.71	7.32	30.26	23.73	30.7	70.58	74.42
SC/(SC + CF) ratio	0.32	0.17	0.96	0.88	0	0.02	1	0.97	0.9	0.83
% dominant taxa	20.29	32.97	44.48	43.85	74.27	37.13	34.62	24.37	55.56	50
Hilsenhoff Biotic Index	6.72	6.42	3.81	4.4	6.17	6.01	2.08	2.87	4.41	4.59
Brillolun Index	2.7	2.3	2.13	2.34	1.17	2.43	2.24	2.42	1.64	1.75

1 Battle Creek north of Chinook
2 Odell Creek
3 W.F. Poplar River at Hwy. 13
4 W.F. Stillwater River
5 Crooked River above Tillett Ranch

Table 22

Effect of Subsample Size on RBP Metrics

Montana: 1990 RBP Reference stream samples.

Site	1	1	2	2	3	3	4	4	5	5
	A	A+B	A	A+B	A	A+B	A	A+B	A	A+B
Total abundance (adjusted)	160	154	436	456	1400	1450	568	555	322	324
EPT abundance	80	75	238	244	524	568	516	497	234	234
Total number taxa	18	20	40	44	34	41	37	45	27	34
Number EPT taxa	8	8	24	25	17	21	26	30	14	17
EPT/Chironomidae abundance	1.33	1.21	7	5.81	1.52	1.63	25.8	20.71	4.68	4.42
SC/(SC + CF) ratio	0.67	0.38	0.91	0.92	0.78	0.77	0.99	0.99	0.91	0.91
Hilsenhoff Biotic Index	4.88	5.05	3.3	3.24	4.09	4.06	1.4	1.39	2.24	2.18
Brilloiun Index	2.17	2.23	2.83	2.94	2.89	2.95	2.65	2.7	2.39	2.43

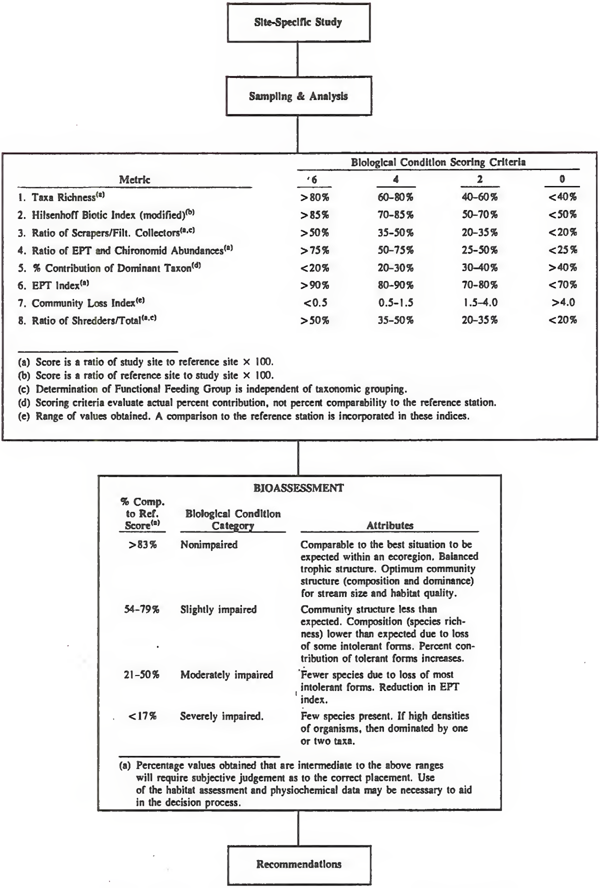
Percentage of sample processed 50 100 50 100 25 50 50 100 50 100

Site	6	6	7	7	8	8	9	9
	A	A+B	A	A+B	A	A+B	A	A+B
Total abundance (adjusted)	1028	1018	558	569	300	316	914	916
EPT abundance	280	254	522	521	252	262	762	762
Total number taxa	30	39	27	36	25	38	37	43
Number EPT taxa	9	11	19	26	15	24	26	27
EPT/Chironomidae abundance	1.75	1.41	18.6	16.3	7.88	6.89	6.15	6.15
SC/(SC + CF) ratio	0.02	0.02	1	1	0.96	0.97	1	0.99
Hilsenhoff Biotic Index	5.98	6.01	2.02	2.08	2.81	2.87	1.44	1.49
Brilloiun Index	2.35	2.43	2.13	2.24	2.33	2.42	2.79	2.83

Percentage of sample processed 25 50 50 100 50 100 25 50

Stream sites

1 BenHart Spring Creek-Veg. Sample
2 Calf Creek
3 Elk Creek
4 Four Mile Creek
5 Pine Creek
6 W.F. Poplar R. RBP 04-1B
7 W.F. Stillwater R. RBP 1D
8 W.F. Stillwater R. RBP 2U
9 S.F. Sun River



Site-Specific Study

Sampling & Analysis

Metric	Biological Condition Scoring Criteria 6	4	2	0
1. Taxa Richness[(a)]	>80%	60-80%	40-60%	<40%
2. Hilsenhoff Biotic Index (modified)[(b)]	>85%	70-85%	50-70%	<50%
3. Ratio of Scrapers/Filt. Collectors[(a,c)]	>50%	35-50%	20-35%	<20%
4. Ratio of EPT and Chironomid Abundances[(a)]	>75%	50-75%	25-50%	<25%
5. % Contribution of Dominant Taxon[(d)]	<20%	20-30%	30-40%	>40%
6. EPT Index[(a)]	>90%	80-90%	70-80%	<70%
7. Community Loss Index[(e)]	<0.5	0.5-1.5	1.5-4.0	>4.0
8. Ratio of Shredders/Total[(a,c)]	>50%	35-50%	20-35%	<20%

(a) Score is a ratio of study site to reference site × 100.
(b) Score is a ratio of reference site to study site × 100.
(c) Determination of Functional Feeding Group is independent of taxonomic grouping.
(d) Scoring criteria evaluate actual percent contribution, not percent comparability to the reference station.
(e) Range of values obtained. A comparison to the reference station is incorporated in these indices.

BIOASSESSMENT

% Comp. to Ref. Score[(a)]	Biological Condition Category	Attributes
>83%	Nonimpaired	Comparable to the best situation to be expected within an ecoregion. Balanced trophic structure. Optimum community structure (composition and dominance) for stream size and habitat quality.
54-79%	Slightly impaired	Community structure less than expected. Composition (species richness) lower than expected due to loss of some intolerant forms. Percent contribution of tolerant forms increases.
21-50%	Moderately impaired	Fewer species due to loss of most intolerant forms. Reduction in EPT index.
<17%	Severely impaired.	Few species present. If high densities of organisms, then dominated by one or two taxa.

(a) Percentage values obtained that are intermediate to the above ranges will require subjective judgement as to the correct placement. Use of the habitat assessment and physiochemical data may be necessary to aid in the decision process.

Recommendations

Figure 1 Flowchart of bioassessment approach advocated for Rapid Bioassessment Protocol III.

Reprinted from Plafkin et al. 1989.

ANALYSIS OF REFERENCE STREAM MACROINVERTEBRATE DATA

	INITIAL ANALYSIS	RESULTS	RECOMMENDATIONS
1	REFERENCE STREAM SELECTION Selection of candidate reference streams from most typical areas of MT ecoregions and subregions. Candidates should be least impacted streams.	Initial reference stream selection performed by Montana Water Quality personnel. Most 1990 candidate streams suffer water/habitat quality degradation to some extent.	Evaluate other candidates as informa- becomes available. Drop atypical sites and sites having extensive impact from human activities. Retain a core of truly least impacted watersheds.
2	SAMPLING Kick samples in riffles during the summer-500 micron. Conduct habitat assessment at same time.	Kick samples were collected and habitat assessments were performed by MT Water Quality Bureau personnel in summer 1990.	Refine protocols for site selection and macroinvertebrate sampling.
3	SAMPLE ANALYSIS Identification of invertebrates to a standardized level of tax. resolution. Ident. of about 300 organisms per sample.	Identifications performed by Aquatic Biology Associates to modified RBP III specifications.	Standardization of the level of taxonomic resolution is important as varying levels of effort can greatly influence metrics.
4	SITE SPECIFIC DATA ANALYSIS Summarize taxa abundances and % contribution. Calculate all potential single site metrics for the bioassessment protocol.	The calculation of a great number of potential metrics for each site completed by Aquatic Biology Associates.	Continue to explore new metrics that have a close relation with water/habitat quality.
5	DEFINE REGIONAL GROUPINGS Conduct a DECORANA (ordination) analysis on data matrix containing abundance data from all candidate reference streams. Select first generation Regional Reference Groupings of streams.	The DECORANA indicated that a very tight clustering of most Plains streams, a tight clustering of most Montane streams, and Valley and foothill prairie Spring streams were signi. diff. from each other. First gen. stream groupings defined will be PLAINS, MONTANE AND SPRING streams.	Further multivariate analysis as new data becomes available. It is hypothesized that the best groupings for reference communities will not be division of the e.g. MONTANE Region into subregional groups, but rather a division by habitat... e.g. Small, Medium, and Large Streams
6	SUMMARIZE REGIONAL DATA Summarize average, min., max., var. information on site metrics describing first generation Regional Reference Communities.	Tabular summaries for the PLAINS, MONTANE and SPRING streams have been prepared that list metric averages and assess metric variation.	Update as needed.
7	CONSTRUCT REFERENCE COMM. Use average taxa abund. to construct composite communities for each region. Necessary for calc. of similarity indices.	First generation Montane, Plains, and and Spring composite comm. have been constructed using mean taxa abundances from candidate reference streams.	Reevaluate and update as needed.
8	CACULATE SIMILARITY METRICS Test each ind. site within a region against the composite ref. comm. using similarity indices or metrics. Average results.	Individual sites within the Montane, Plains and Spring "regions" have been tested against the composite reference comm., and the average values for various similarity indices computed.	Reevaluate and update as needed.
9	METRIC SELECTION Select a 1st generation of metrics for each region for the bioassessment protocol. Develop initial scoring criteria.	First gen. metrics have been selected on basis of: 1.historical use as water qual. indicators, 2.variability exhibited amongst ref. streams, and 3.incorporate diff. classes of metrics (richness, tax.,FFG's etc.).	Continue to explore & evaluate individue metrics. Assemblages of indicator taxa may be particularly valuable. Quality, i.e. response to water/hab. qual. degradatio more important than quantity of metrics.
10	SUMMARIZE HABITAT INFORMATION Tabulate habitat scores from field data sheets.	Total habitat assessment scores have been tabulated for ref. streams. Current hab. ass. protocol does not correlate well with ind. and total metric scores.	Overhaul of habitat assessment protocol recommended.
11	TEST RESULTS Test the bioassessment protocol developed above on stream sites which exhibit a range of impacts.	Bioassessment protocol developed to date tested on 1990 Demonstration Project data. Results are very encouraging.	Continue to evaluate this first gen. bioas protocol on different sites, particularly where there is a gradient of water/hab. degradation.

Figure 2

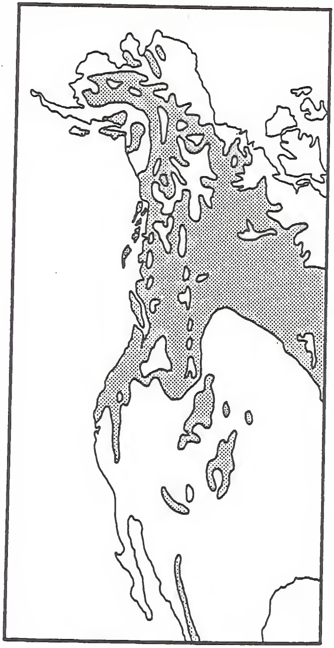


Figure 3. The distribution of humid coniferous forests in western North America (shaded). Redrawn from Anonymous (1953).

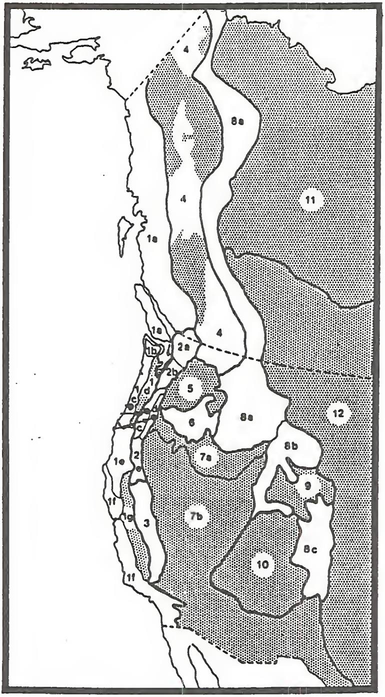

4
8a
4
11
1a
1a
4
2a
1b
2b
1
c
1
d
5
c
6
8a
12
8b
7a
2
c
1e
9
7b
1f
1g
3
8c
10
1f

Figure 4. Physiographic provinces and regions of montane western North America.

HIERARCHY OF BIOASSESSMENT PROTOCOL COMPARISONS

State of Montana

Bioassessment sensitivity should increase with each lower level of the hierarchy.
Utilization of several comparison levels can increase interpretive power.

Comparison with Composite Regional Reference

The first generation of regional reference communities and average metric scores have divided running water habitats into three regions: 1. MONTANE, 2. PLAINS, AND 3. VALLEY AND FOOTHILL PRAIRIE SPRING STREAMS. Comparisons made against Regional Reference benchmark values can be used for initial screening of large numbers of sites. Metrics with broad applicability are most suitable.

Comparison with Composite Subregional or Habitat Type Ref.

The three regions indicated above may eventually be subdivided into either subregions, or by major habitat types, e.g. Small, Medium, Large streams and Riverine. Average metric values and composite reference communities would then be developed for each subregion or habitat type. Achievement of this level should lower metric variability and improve Bioassessment sensitivity for survey and screening purposes. More specialized metrics can be incorporated.

Comparison with a Single External Watershed Reference

Use of control or reference watersheds for specific streams or sites. Care must be taken that comparisons be made only between sites having similar characteristics and potential. Matching of a minimally impacted stream versus a potentially impacted comparison stream is usually difficult. Metrics may have to be modified to account for atypical situations.

Comparison with an Upstream Control or Reference

This type of comparison is often productive if minimally impacted upstream sites can be found that share similar characteristics and potential with downstream sites of interest. Be aware of natural gradients (e.g. longitudinal, altitudinal, etc.). More specialized metrics can be incorporated.

Trend Monitoring of Specific Sites.

Establish baseline conditions at a site, preferably using data from several year Monitor trends and hopefully recovery. More specialized metrics can be incorporated here, particularly ones based on specific taxa or taxa assemblages.

Figure 5

METRIC SUMMARY

Armstrong Spring Creek, Sample 1, July 11, 1990.
Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 2546
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 820

TOTAL NUMBER OF TAXA = 24
Number EPT taxa = 7

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	8	706	27.71
Odonata	0	0	.00
Ephemeroptera	3	500	19.64
Plecoptera	0	0	.00
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	4	320	12.56
Lepidoptera	0	0	.00
Coleoptera	1	24	.94
Misc. Diptera	2	20	.79
Chironomidae	6	976	38.33

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = .84
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	1	24	.94
Parasite	1	4	.16
Collector-gatherer	14	1690	66.35
Collector-filterer	2	28	1.10
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	2	288	11.31
Scraper	1	8	.31
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	2	500	19.64
Unknown	1	4	.16

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = .29
Scraper/(Scraper + C.-filterer) = .22
Shredder/Total organisms = .000

Figure 6

```
Armstrong Spring Creek, Sample 1, July 11, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Baetis tricaudatus             492    19.32
Eukiefferiella                 476    18.70
Pagastia                       440    17.28
Physella                       326    12.80
Hydroptila                     276    10.84
SUBTOTAL 5 DOMINANTS          2010    78.94
Caecidotea                     148     5.81
Turbellaria                    108     4.24
Gammarus                        52     2.04
Stagnicola                      36     1.41
Hirudinea                       24      .94
TOTAL 10 DOMINANTS            2378    93.38

SAPROBIC INDICES
Hilsenhoff Biotic Index             =   5.73
Biotic Condition Index
   Community Tolerance Quotient (a) =  89.04
   Community Tolerance Quotient (d) = 132.00

DIVERSITY MEASURES
Shannon H (loge) =  2.26
Shannon H (log2) =  3.26
Evenness         =   .71
Brillouin H      =  2.24
Simpson D        =   .14

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine      1420    55.77
Univoltine        1074    42.18
Semivoltine         52     2.04

INDICATOR ASSEMBLAGES
ASSEMBLAGE              ABUNDANCE     PERCENT
  A                             0         .00
  B                             0         .00
  C                             0         .00
  D                             0         .00
  E                             0         .00
  F                             0         .00
  G                             0         .00
  H                             0         .00
  I                             0         .00
  J                             0         .00

 End of report.
```

Figure 6

Armstrong Spring Creek, Sample 1, July 11, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
A150	Turbellaria	108	4.24
C010	Hirudinea	24	0.94
D150	*Sphaerium*	8	0.31
D580	*Stagnicola*	36	1.41
D670	*Physella*	326	12.80
E550	Gammarus	52	2.04
E710	*Caecidotea*	148	5.81
F000	Acari	4	0.16
	TOTAL: MISC. TAXA	706	27.73
H142	*Baetis tricaudatus*	492	19.32
H765	*Ephemerella inermis*	4	0.16
I600	*Paraleptophlebia*	4	0.16
	TOTAL: EPHEMEROPTERA	500	19.64
N130	*Amiocentrus aspilus*	12	0.47
N170	*Brachycentrus occidentalis*	24	0.94
N450	*Glossosoma*	8	0.31
O070	*Hydroptila*	276	10.84
	TOTAL: TRICOPTERA	320	12.57
S220	*Heterlimnius*	24	0.94
	TOTAL: COLEOPTERA	24	0.94
U400	*Brachycera*	4	0.16
W450	*Simulium*	16	0.63
	TOTAL: DIPTERA	20	0.79
Y460	*Cricotopus*	24	0.94
Y520	*Cricotopus Nostococladius*	12	0.47
Y750	*Eukiefferiella*	476	18.70
Z095	*Micropsectra*	12	0.47
Z230	*Pagastia*	440	17.28
Z630	*Tanytarsus*	12	0.47
	TOTAL: CHIRONOMIDAE	976	38.33
	GRAND TOTAL	2546	100.00

Physella lordi, Sphaerium simile, Stagnicola elrodi,
Gammarus lacustris, Caecidotea racovitzae racovitzae,
Ophidonais serpentina, Nais communis

Figure 7

```
                 METRIC SUMMARY: DUAL SITE COMPARISON

 REFERENCE SITE:
Montana: Montane Reference Community-1990 Version.

 COMPARISON SITE:
Big Creek, July 26, 1990.

REFERENCE SITE:                COMPARISON SITE:
Total abundance    =    501.   Total abundance    =    285.
Total number taxa =      34.   Total number taxa =      29.
Number EPT taxa    =     26.   Number EPT taxa    =     20.

Total taxa in common =    18.
EPT taxa in common   =    12.

Community loss index  =    .552
Jaccard similarity    =    .400
Common taxa index     =    .529
Pinkham-Pearson similarity index (B2): SI       =    .018
Quantitative similarity index                   =    .437
Quantitative similarity index (Feeding groups) =    .713

DOMINANT TAXA:
 REFERENCE SITE                 COMPARISON SITE
 1 Baetis tricaudatus            Baetis tricaudatus
 2 Rhithrogena                   Cinygmula
 3 Drunella doddsi               Serratella tibialis
 4 Epeorus albertae              Epeorus albertae
 5 Cinygmula                     Drunella coloradensis
 6 Epeorus grandis               Orthocladius
 7 Glossosoma                    Ameletus
 8 Megarcys                      Eukiefferiella
 9 Yoraperla                     Epeorus longimanus
10 Brachycentrus americanus      Glossosoma

DOMINANTS IN COMMON
Among 5 most abundant  =  3.
Among 10 most abundant =  4.
```

Figure 8

HABITAT ASSESSMENT FIELD DATA SHEET

Habitat Parameter	Excellent	Good	Fair	Poor
1. Bottom substrate/ available cover[a]	Greater than 50% rock gravel, or other stable habitat. 16 16-20	30-50% rock, gravel or other stable habitat. Adequate habitat. 11-15	10-30% rock gravel or other stable habitat. Habitat availability less than desirable. 6-10	Less than 10% rock gravel or other stable habitat. Lack of habitat is obvious. 0-5
2. Embeddedness[b]	Gravel, cobble, and boulder particles are between 0 and 25% surrounded by fine sediment 16-20	Gravel, cobble, and boulder particles are between 25 and 50% surrounded by fine sediment 11-15	Gravel, cobble, and boulder particle are between 50 and 75% surrounded by fine sediment 10 6-10	Gravel, cobble, and boulder particles are over 75% surrounded by fine sediment 0-5
3. 50.15 cms (5 cfs) Flow at rep. low flow[a]	Cold >0.05 cms (2 cfs) Warm >0.15 cms (5 cfs) ⑱ 10-20 runs not common	0.03-0.05 cms (1-2 cfs) 0.05-0.15 cms (2-5 cfs) 11-15	0.01-0.03cms (.5-1 cfs) 0.03-0.05cms (1-2 cfs) 6-10	<0.01 cms (.5 cfs) <0.03 cms (1 cfs) 0-5
or >0.15 cms (5cfs) Velocity/depth	Slow (<0.3 m/s), deep (>0.5 m); slow, shallow (<0.5 m); fast (>0.3 m/s), deep; fast, shallow habitats all present 16-20	Only 3 of the 4 habitat categories present (missing riffles or runs receive lower score than missing pools). 11-15	Only 2 of the 4 habitat categories present (missing riffles/runs receive lower score). 6-10	Dominated by one velocity/depth category (usually pool).
4. *Channel alteration[a]	Little or no enlargement of islands or point bars, and/or no channelization. 12-15	Some new increase in bar formation, mostly from coarse gravel; and/~~or some~~ channelization present. 9 8-11	Moderate deposition of new gravel, coarse sand on old and new bars; pools partially filled w/silt; and/or embankments on both banks. 4-7	Heavy deposits of fine material, increased bar development; most pools filled w/silt; and/or extensive channelization. 0-3
5. Bottom scouring and deposition[a]	Less than 5% of the bottom affected by scouring and deposition. 12-15	5-30% affected. Scour at constructions and where grades steepen. Some deposition in pools. 9 8-11	30-50% affected. Deposits and scour at obstructions, constrictions and bends. Some filling of pools. 4-7	More than 50% of the bottom changing nearly year long. Pools almost absent due to deposition. Only large rocks in riffle exposed. 0-3

Figure 9

HABITAT ASSESSMENT FIELD DATA SHEET (Continued)

Habitat Parameter	Excellent	Good	Fair	Poor
6. Pool/riffle, run/bend ratio[a] (distance between riffles divided by stream width)	5-7. Variety of habitat. Deep riffles and pools. 12-15	7-15. Adequate depth in pools and riffles. Bends provide habitat. 11 8-11	Occasional riffle or bend. Bottom contours provide some habitat. 4-7	>25. Essentially a straight stream. Generally all flat water or shallow riffle. Poor habitat. 0-3
		Riffles good / Pools are small & infrequent		
7. Bank stability[a]	Stable. No evidence of erosion or bank failure. Side slopes generally <30%. Little potential for future problem. 9-10	Moderately stable. Infrequent, small areas of erosion mostly healed over. Side slopes up to 40% on one bank. Slight potential in extreme floods. 6-8	Moderately unstable. Moderate frequency and size of erosional areas. Side slopes up to 60% on some banks. High erosion potential during extreme high flow. 5 3-5	Unstable. Many eroded areas. Side slopes <60% common. "Raw" areas frequent along straight sections and bends. 0-2
8. Bank vegetative stability[b]	Over 80% of the streambank surfaces covered by vegetation or boulders and cobble. 9-10	50-79% of the streambank surfaces covered by vegetation, gravel or larger material. 6 6-8	25-49% of the streambank surfaces covered by vegetation, gravel, or larger material. 3-5	Less than 25% of the streambank surfaces covered by vegetation, gravel, or larger material. 0-2
9. Streamside cover[b]	Dominant vegetation is shrub. 8-9 9-10	Dominant vegetation is of tree form. 6-8	Dominant vegetation is grass or forbes. 3-5	Over 50% of the streambank has no vegetation and dominant material is soil, rock, bridge materials, culverts, or mine tailings. 0-2
Column Totals Score ______	______	______	______	______

[a] From Ball 1982.
[b] From Platts et al. 1983.

Armstrong Spring Creek

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HAARMSPR

	Year	90								Mean	REF
	Month/Day	July 11									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	20									
2	Embeddedness	18									
3	Flow	20									
4	Channel alteration	15									
5	Bottom scouring and deposition	15									
6	Pool/riffle, run/bend ratio	14									
7	Bank stability	9									
8	Bank vegetation stability	10									
9	Streamside cover	9									
	TOTAL SCORE	130	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

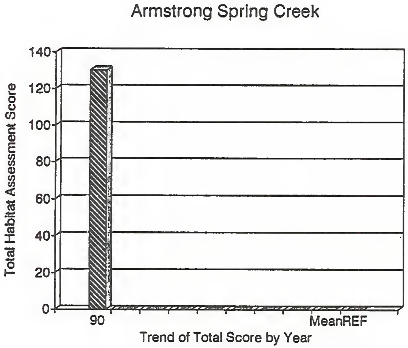


Figure 10

PHYSICAL CHARACTERIZATION/WATER QUALITY
FIELD DATA SHEET

PHYSICAL CHARACTERIZATION WALDRON CREEK 9-11-90 1400hrs

RIPARIAN ZONE/INSTREAM FEATURES

[✓ Forest] Field/Pasture Agricultural Residential Commerical Industrial Other

Local Watershed Erosion: None [✓ Moderate] + Heavy numerous slumps in wet areas adjacent to stream bottom

Local Watershed NPS Pollution: No evidence [✓ Some Potential Sources] Obvious Sources Closed road left bank, uphill

Estimated Stream Width 4 ft ~~m~~ Estimated Stream Depth: Riffle 4" ~~m~~ Run N/A m Pool 8" ~~m~~

High Water Mark +1/3m / 3 m Velocity 1.5'/sec Dam Present: Yes ___ No ✓ Channelized: Yes ___ No ✓

Canopy Cover: Open [✓ Partly Open] Partly Shaded Shaded

SEDIMENT/SUBSTRATE:

Sediment Odors: [✓ Normal] Sewage Petroleum Chemical Anaerobic None Other ______

Sediment Oils: [✓ Absent] Slight Moderate Profuse

Sediment Deposits: Sludge Sawdust Paper Fiber Sand Relict Shells Other Silt

Are the undersides of stones which are not deeply embedded black? Yes ___ No ✓

Figure 11
71

Inorganic Substrate Components

Substrate type	Diameter	Percent Composition in sampling area
Bedrock	>4' dia	3
Boulder	>256-mm (10 in.)	20%
Cobble	64-256-mm (2.5-10 in.)	30%
Gravel	2-64-mm (0.1-2.5 in.)	30%
Sand	0.06-2.00-mm (gritty)	4
Silt	.004-.06-mn	10
Clay	<.004-mm (slick)	T

Organic Substrate Components

Substrate Type	Characteristic	Percent Composition in sampling area
Detritus	Sticks, Wood, Coarse Plant Materials (CPOM)	3
Muck-Mud	Black, Very Fine Organic (FPOM)	T
Marl	Grey, Shell Fragments	0

Waldron Creek
HAWALD
ASWALD

WATER QUALITY

Temperature 50° ~~C~~ F Dissolved Oxygen 9.4 mg/l pH lab Conductivity lab ? Other ______

Instrument(s) Used ______

Stream Type: [✓ Coldwater] Warmwater

Water Odors: Normal Sewage Petroleum Chemical [✓ None] Other ______

Water Surface Oils: Slick Sheen Globs Flecks [✓ None]

Turbidity: [✓ Clear] Slightly Turbid Opaque Water Color

Weather Conditions Sunny, scattered clouds, hot upper 80s

Number of Kick Samples: 3 kicks

Photograph Number #20 downstream
#21 closeup
#22 upstream

Est flow = 2.5 cfs

Duration of Kick Samples (seconds): 3 min; 43 sec

Approximate lengths of disturbed sections: 15 ft?
Traveled both across and up riffles

Rapid Bioassessment Protocol III
Biosurvey Field Data

RELATIVE ABUNDANCE OF AQUATIC BIOTA

Periphyton	0 1 [✓ 2] 3 4 5	Hydrozoa	[✓ 0] 1 2 3 4	Macroinvertebrates	0 1 [✓ 2] 3 4 5
Filamentous Algae	[✓ 0] 1 2 3 4	Slimes	0 [✓ 1] 2 3 4	Fish	[✓ 0] 1 2 3 4
Aquatic Moss	0 [✓ 1] 2 3 4	Porifera	[✓ 0] 1 2 3 4	Other Macrophytes	[✓ 0] 1 2 3 4

0 = Absent / Not Observed   1 = Rare   2 = Common   3 = Abundant   ~~5 = Dominant~~

THREE NUMBER SUBSTRATE EVALUATION

6 - 3 - 2

First Value = Dominant Substrate Particle Size Class (from A below)
Second Value = Degree of embeddedness (from B below)
Third Value = Dominant Embedding Material (from A below)

Class Description A

1	Particulate organic matter -- detritus
2	less than 1.5 mm in diameter (1/16 in) -- sand
3	1.5 - 6.4 mm in diameter (1/16 - 1/4 in) -- coarse sand
4	6.4 - 25.4 mm in diameter (1/4 - 1 in) -- small pebble
5	25.4 - 63.5 mm in diameter (1 - 2 1/2 in) large pebble
6	63.5 - 127.0 mm in diameter (2 1/2 -.5 in) -- small cobble
7	127.0 - 254.0 mm in diameter (6 - 10 in) -- large cobble
8	greater than 254.0 mm in diameter (10 in) -- boulder

Class Description B

1	nearly 100% embedded (heavy)
2	75% embeddedness (moderate)
3	50% embeddedness (intermediate)
4	25% embedded (light)
5	unembedded

No CPOM Sample collected

Comments, Observations:

- Sample site located approximately 900 yds above rd (N. Fork Teton) X-ing. Follow closed road up hill to seep area just below wide spot (field) on road.
- Stream carries substantial spring flows/some scour and blown debris jams evident.
- Banks are quite unstable in areas where seeps enter. Streamflow also contributes to instability.
- Numerous slumps upslope from actual channel occur in seep areas
- Upslope slumps & eroding streambank are probable sources of moderate to heavy instream silt deposition. Aquatic habitat habitat bug/spawning may be moderately impaired
- Habitat features primarily riffle areas w/ occasional plunge pools and common pocket water pools. Runs generally not present except ~~near~~ on edges of riffles
- Vegetation primarily mature & immature Spruce w/ shrub (m & im) understory
- Some apparent calichite (Ca deposits)

Armstrong Spring Creek

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSARMSPR

Date	Jul 11 90				
Investigator					

Riparian Zone/Instream Features

Land class	Fiel/Pas				
Local watershed erosion	none				
Local NPS pollution	no				
Estimated stream width (m)	20				
Estimated stream depth (m)					
Riffle	0.2				
Run	0.5				
Pool					
High water mark (m)	NA				
Velocity					
Dam present?	no				
Channelized?	no				
Canopy cover	open				
Other					

Sediment/Substrate

Sediment odors	normal				
Sediment oils	absent				
Sediment deposits	sand				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock					
Boulder	40				
Cobble	50				
Gravel	10				
Sand					
Silt					
Clay					
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM					
Muck-Mud					
Marl					
Other					

Figure 12

Armstrong Spring Creek
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	12.7				
Dissolved oxygen (ppm)	14.1				
pH					
Conductivity					
Other					
Stream type	cold				
Water odors	normal				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

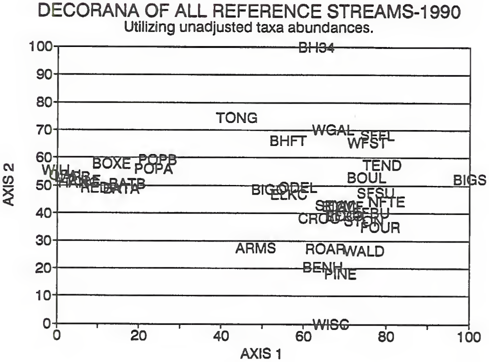
Periphyton	3				
Filamentous algae	2				
Aquatic moss	2				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	5				
Fish	4				
Other macrophytes	5				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	7				
Degree of embeddedness	4				
Dominant embedding material	5				

Comments

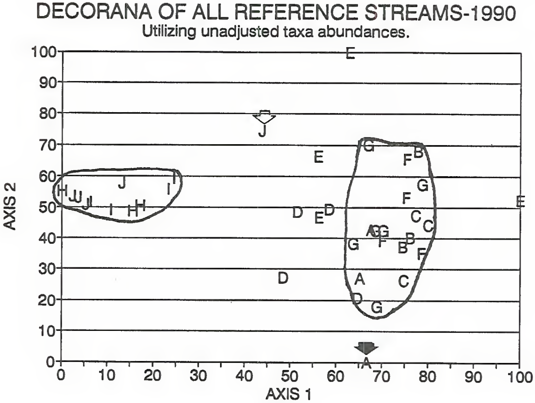
:1990: Fish for fee ($40/day); nice stream; many fisherman present


DECORANA OF ALL REFERENCE STREAMS-1990
Utilizing unadjusted taxa abundances.

Northern Rockies		Spring Creeks		Middle Rockies	
WISC	Wisconisin	ARMS	Armstrong Spring	LFRO	Lake Fork Rock
SEYM	Seymour	BENH	Ben Hart Spring	FOUR	Four Mile
ROAR	Roaring Lion	BH34	Big Hole R. at hwy 34	WFST	W.F. Stillwater R.
STON	Stony	BHFT	Big Hole R. at Fish trap	BOUL	Boulder
EFBU	E.F. Bull River	BIGO	Big Otter	PINE	Pine
SFFL	S.F. Flathead River	BIGS	Big Spring	CALF	Calf
WALD	Waldron	ODEL	Odell	CROO	Crooked
NFTE	N.F. Teton River	ELKC	Elk	TEND	Tenderfoot
SFSU	S.F. Sun River			BIGC	Big
				WGAL	W. Gallatin R.

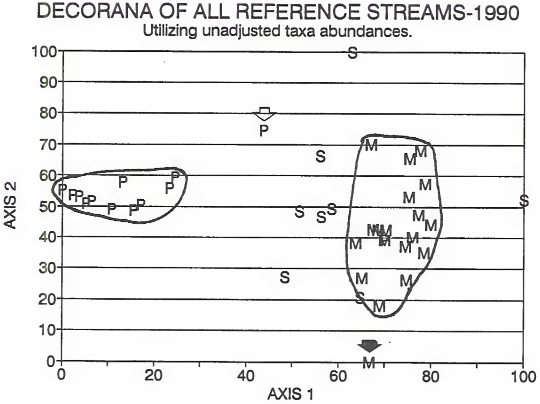
Plains		Plains		Plains	
ROCK	Rock	POPA	Poplar A	HANG	Hanging Woman
BATA	Battle A	POPB	Poplar B	OFAL	O'Fallon
BATB	Battle B	REDW	Redwater River	TONG	Tongue River
WILL	Willow	LARB	Larb		
TULE	Tule	BOXE	Box Elder		

Figure 13



A Northern Rockies-Granitics
B Northern Rockies, Non-Granitics, West Side
C Northern Rockies, Non-Granitics, East Side
D Spring Creeks
E Special Creeks
F Middle Rockies, Absaroka-Beartooth Range
G Middle Rockies, Other Geology
H Northern Montana Glaciated Plains
I Northwestern Glaciated Plains
J Northwestern Glaciated Plains

Figure 14



DECORANA OF ALL REFERENCE STREAMS-1990

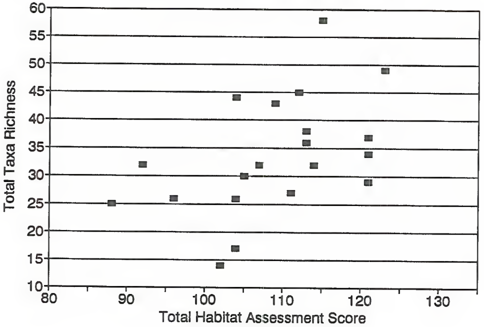
Utilizing unadjusted taxa abundances.

M= Montane Streams
P= Plains Streams
S= Spring Creeks

Figure 15

MONTANE REFERENCE STREAMS

Total Taxa Richness vs. Total Hab. Ass.



MONTANE REFERENCE STREAMS

EPT Richness vs. Total Hab. Ass.

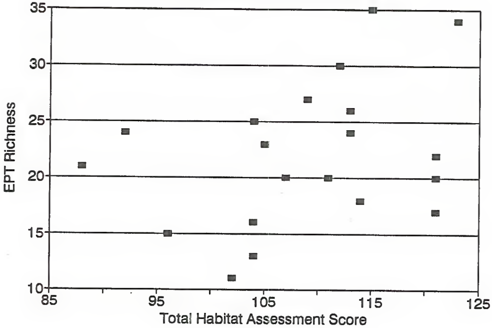


Figure 16

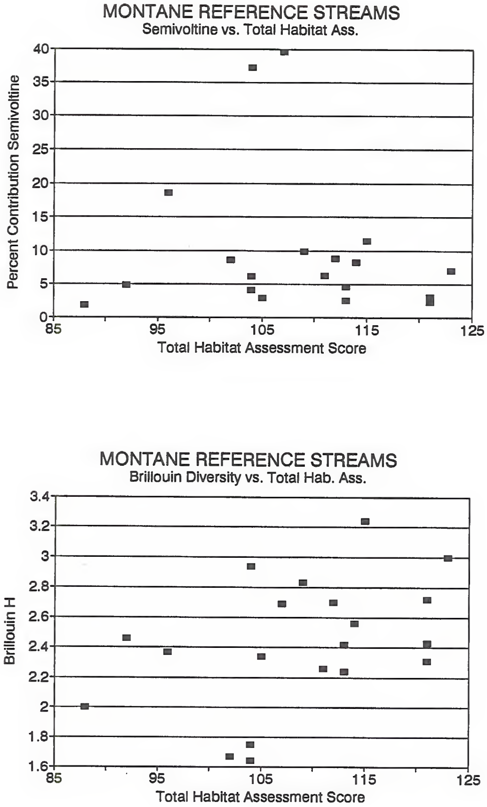

MONTANE REFERENCE STREAMS
Semivoltine vs. Total Habitat Ass.
Percent Contribution Semivoltine
0
5
10
15
20
25
30
35
40
85
95
105
115
125
Total Habitat Assessment Score
MONTANE REFERENCE STREAMS
Brillouin Diversity vs. Total Hab. Ass.
Brillouin H
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
85
95
105
115
125
Total Habitat Assessment Score

Figure 17

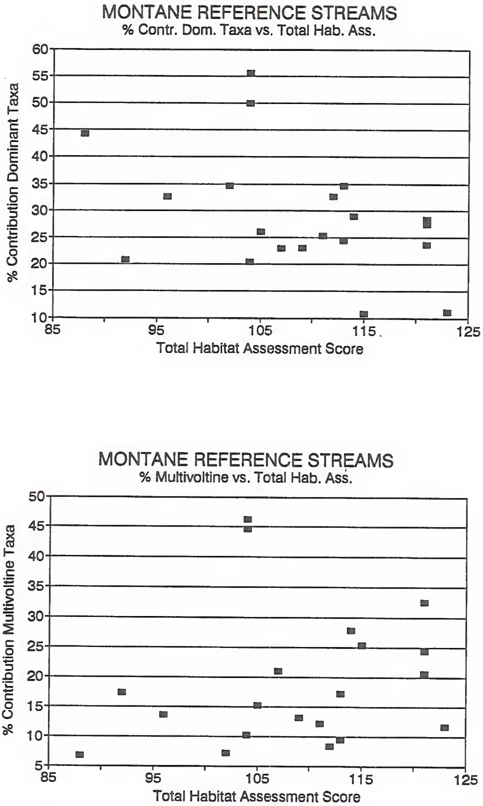
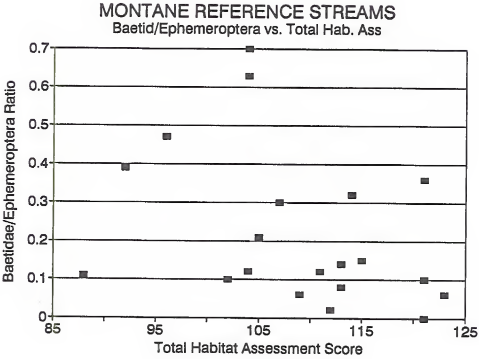

MONTANE REFERENCE STREAMS
% Contr. Dom. Taxa vs. Total Hab. Ass.
% Contribution Dominant Taxa
60
55
50
45
40
35
30
25
20
15
10
85
95
105
115
125
Total Habitat Assessment Score
MONTANE REFERENCE STREAMS
% Multivoltine vs. Total Hab. Ass.
% Contribution Multivoltine Taxa
50
45
40
35
30
25
20
15
10
5
85
95
105
115
125
Total Habitat Assessment Score

Figure 18


MONTANE REFERENCE STREAMS
Baetid/Ephemeroptera vs. Total Hab. Ass
Baetidae/Ephemeroptera Ratio
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
85
95
105
115
125
Total Habitat Assessment Score

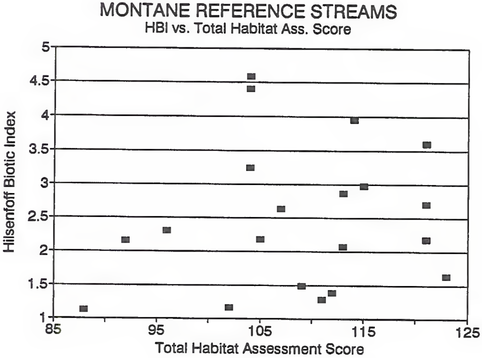
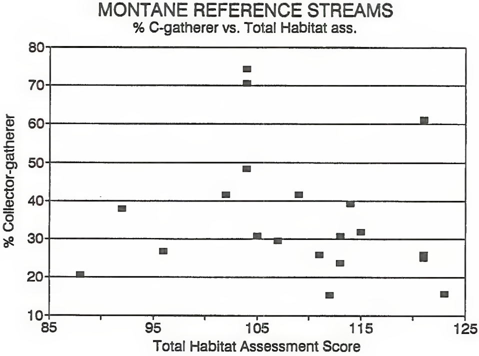

MONTANE REFERENCE STREAMS
HBI vs. Total Habitat Ass. Score
Hilsenfoff Biotic Index
5
4.5
4
3.5
3
2.5
2
1.5
1
85
95
105
115
125
Total Habitat Assessment Score

Figure 19


MONTANE REFERENCE STREAMS
% C-gatherer vs. Total Habitat ass.
% Collector-gatherer
80
70
60
50
40
30
20
10
85
95
105
115
125
Total Habitat Assessment Score

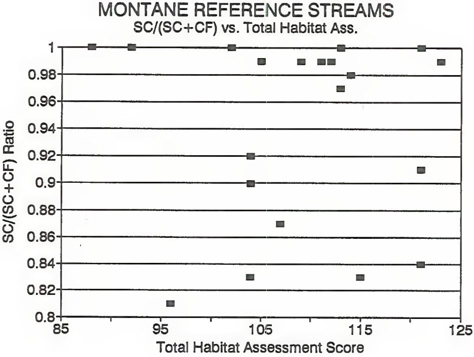

MONTANE REFERENCE STREAMS
SC/(SC+CF) vs. Total Habitat Ass.
SC/(SC+CF) Ratio
1
0.98
0.96
0.94
0.92
0.9
0.88
0.86
0.84
0.82
0.8
85
95
105
115
125
Total Habitat Assessment Score

Figure 20

DECORANA

The full DECORANA output for the 1990 Montana Reference Stream Project is included in this appendix. Raw taxa abundances from riffle samples from all sites were included in the matrix. See disc files for matrices. See Hill (1979) and Gauch (1982) for more information.

```
ENTER TRANSFORMATION IN FREE FORMAT
A NEGATIVE ENTRY TERMINATES TRANSFORMATION DATA
IF NO TRANSFORMATION DESIRED, MERELY TYPE -1 0
   -1.00    0.00

NO TRANSFORMATION OF DATA WILL BE MADE

IS DOWNWEIGHTING OF RARE SPECIES REQUIRED?
TYPE 1 IF YES, TYPE 0 IF NO:

ANSWER =  0

IS RESCALING OF AXES REQUIRED?
TYPE 0 (DEFAULT), -1 (NO RESCALING), OR NUMBER OF TIMES TO BE DONE:

ANSWER =  0

TYPE 0 IF DETRENDED CORRESPONDENCE ANALYSIS REQUIRED
TYPE 1 IF BASIC RECIPROCAL AVERAGING:

ANSWER =  0

SPECIFY NUMBER OF SEGMENTS - OR TYPE 0 FOR DEFAULT VALUE:

ANSWER =  0

SPECIFY RESCALING THRESHOLD - OR TYPE 0 FOR DEFAULT:
    0.00

SHOULD A COPY OF SOLUTION BE WRITTEN TO DEVICE NUMBER 7?
TYPE 1 IF YES, TYPE 0 IF NO:

ANSWER =  1


ENTER NUMBERS (NOT NAMES) OF SAMPLES TO BE OMITTED
ONE AT A TIME, ENDING LIST WITH A ZERO
              0



NO DOWNWEIGHTING

AXES ARE RESCALED
```

```
RESIDUAL  0.352295        AT ITERATION  0
RESIDUAL  0.054226        AT ITERATION  1
RESIDUAL  0.D11300        AT ITERATION  2
RESIDUAL  0.001625        AT ITERATION  3
RESIDUAL  0.000406        AT ITERATION  4
RESIDUAL  0.000066        AT ITERATION  5
EIGENVALUE   0.89673


LENGTH OF GRADIENT     6.371
LENGTH OF SEGMENTS  0.29  0.28  0.26  0.24  0.23  0.23  0.23  0.23  0.23  0.24
LENGTH OF SEGMENTS  0.23  0.2D  0.15  0.13  0.13  0.13  0.14  0.14  D.15  D.16
LENGTH OF SEGMENTS  0.17  0.18  D.19  0.20  0.22  0.23  0.24  0.24  0.22  0.17
LENGTH OF SEGMENTS  0.16  0.15
LENGTH OF GRADIENT     6.541


LENGTH OF GRADIENT     6.792
LENGTH OF SEGMENTS  0.25  0.24  0.23  0.21  0.19  0.19  0.18  0.18  0.18  0.18
LENGTH OF SEGMENTS  0.18  0.20  0.24  0.23  0.20  0.18  0.16  0.16  0.16  0.17
LENGTH OF SEGMENTS  0.18  0.19  0.20  0.20  0.21  0.22  0.23  0.24  0.24  0.23
LENGTH OF SEGMENTS  0.21  0.18  0.17  0.17
LENGTH OF GRADIENT     6.796


RESIDUAL  0.175666        AT ITERATION  0
RESIDUAL  0.062511        AT ITERATION  1
RESIDUAL  0.038482        AT ITERATION  2
RESIDUAL  0.011996        AT ITERATION  3
RESIDUAL  0.0D5190        AT ITERATION  4
RESIDUAL  0.001601        AT ITERATION  5
RESIDUAL  0.000687        AT ITERATION  6
RESIDUAL  0.000214        AT ITERATION  7
RESIDUAL  0.000092        AT ITERATION  8
EIGENVALUE   0.56486


LENGTH OF GRADIENT     2.973
LENGTH OF SEGMENTS  0.31  0.34  0.34  0.33  0.31  0.28  0.24  0.17  0.12  0.10
LENGTH OF SEGMENTS  0.09  0.09  0.08  0.08  0.08
LENGTH OF GRADIENT     4.417


LENGTH OF GRADIENT     4.472
LENGTH OF SEGMENTS  0.15  0.16  0.17  0.18  0.19  0.20  0.21  0.22  0.23  0.25
LENGTH OF SEGMENTS  0.26  0.26  0.25  0.22  0.20  0.18  0.17  0.16  0.15  0.15
LENGTH OF SEGMENTS  0.16  0.17  0.18
LENGTH OF GRADIENT     4.343


RESIDUAL  0.114003        AT ITERATION  0
RESIDUAL  0.053144        AT ITERATION  1
RESIDUAL  0.00334D        AT ITERATION  2
RESIDUAL  0.017786        AT ITERATION  3
RESIDUAL  0.010376        AT ITERATION  4
RESIDUAL  0.010697        AT ITERATION  5
RESIDUAL  0.004264        AT ITERATION  6
RESIDUAL  0.003392      AT ITERATION  7
RESIDUAL  0.001308      AT ITERATION  8
RESIDUAL  0.001023      AT ITERATION  9
RESIDUAL  0.000396      AT ITERATION 10
EIGENVALUE   0.34232
*** BEWARE ***    RESIDUAL BIGGER THAN TOLERANCE, WHICH IS   0.00010


LENGTH OF GRADIENT     2.058
LENGTH OF SEGMENTS  0.31  0.30  0.29  0.26  0.23  0.19  0.14  0.10  0.08  0.07
LENGTH OF SEGMENTS  0.07
LENGTH OF GRADIENT     3.039


LENGTH OF GRADIENT     3.417
LENGTH OF SEGMENTS  0.14  0.14  0.16  0.19  0.22  0.25  0.27  0.28  0.28  0.26
LENGTH OF SEGMENTS  0.22  0.18  0.15  0.14  0.13  0.13  0.14  0.14
LENGTH OF GRADIENT     3.289


RESIDUAL  0.071601      AT ITERATION  0
RESIDUAL  0.046258      AT ITERATION  1
RESIDUAL  0.005424      AT ITERATION  2
RESIDUAL  0.000919      AT ITERATION  3
RESIDUAL  0.000133      AT ITERATION  4
RESIDUAL  0.000024      AT ITERATION  5
EIGENVALUE   0.26259


LENGTH OF GRADIENT     2.623
LENGTH OF SEGMENTS  0.17  0.19  0.22  0.25  0.26  0.25  0.23  0.20  0.18  0.15
LENGTH OF SEGMENTS  0.14  0.13  0.12  0.12
LENGTH OF GRADIENT     2.804


LENGTH OF GRADIENT     2.739
LENGTH OF SEGMENTS  0.18  0.18  0.19  0.21  0.23  0.23  0.22  0.21  0.20  0.19
LENGTH OF SEGMENTS  0.18  0.18  0.17  0.17
LENGTH OF GRADIENT     2.712
```

```
  215   40MT:Reference streams, all taxa, 1990
DECORANA OPTIONS -- DOWNWEIGHTING 0   RESCALING  4   ANALYSIS 0   SEGMENTS 26   THRESHOLD  0.00
TRANSFORMATION          0.00    0.00

SPECIES SCORES

   N      NAME   AX1  AX2  AX3  AX4 !          RANKED 1      !          RANKED 2      !          RANKED 3      !          RANKED 4      !
                                     !         EIG=0.897      !         EIG=0.565      !         EIG=0.342      !         EIG=0.263      !
   1         1   438  -76   12   77 !  102          102  714 !  107          107  506 !  177          177  428 !   75           75  367 !
   2         2    10  224  357  129 !   86           86  700 !  162          162  506 !  192          192  428 !   92           92  361 !
   3         3   393  371  131  136 !   88           88  699 !  130          130  492 !  196          196  428 !  100          100  361 !
   4         4   304  326  160  158 !  129          129  672 !   39           39  484 !  201          201  402 !  191          191  361 !
   5         5   143  210  260  165 !   36           36  670 !   58           58  465 !   77           77  377 !   93           93  354 !
   6         6   356  187   86   -9 !   57           57  666 !  124          124  458 !  114          114  368 !   73           73  351 !
   7         7   377   80  110  250 !  158          158  660 !   52           52  446 !  198          198  368 !   38           38  337 !
   8         8   124  246   52   45 !  178          178  627 !  127          127  429 !  171          171  359 !  111          111  337 !
   9         9   405  154   64  323 !  122          122  623 !  163          163  428 !    2            2  357 !  136          136  325 !
  10        10    43  216  260  121 !  105          105  616 !   60           60  426 !   81           81  350 !    9            9  323 !
  11        11     0  220  322  109 !   90           90  612 !   70           70  417 !   82           82  350 !  113          113  302 !
  12        12   -46  209  -46  107 !   56           56  599 !   67           67  414 !  132          132  350 !   87           87  299 !
  13        13   -26  217   -2  111 !  121          121  598 !   72           72  404 !  212          212  349 !  110          110  294 !
  14        14    22  284  186  127 !   47           47  594 !  147          147  403 !  204          204  327 !  150          150  294 !
  15        15   151  199  179  164 !  131          131  590 !   55           55  394 !  115          115  326 !  106          106  293 !
  16        16   -20  209  -63  101 !  109          109  577 !  208          208  392 !  140          140  323 !   85           85  287 !
  17        17   372  169   80  -51 !   61           61  575 !  110          110  390 !   11           11  322 !  200          200  282 !
  18        18   174  235  294  260 !  110          110  574 !  150          150  390 !   48           48  322 !   56           56  281 !
  19        19   248  319  290  -10 !  120          120  574 !  106          106  386 !   25           25  309 !   72           72  279 !
  20        20   -36  218  298  120 !  150          150  574 !  152          152  381 !  190          190  309 !   70           70  278 !
  21        21    20  220  303  150 !  106          106  572 !  146          146  375 !   76           76  307 !  193          193  278 !
  22        22   310  104  164   99 !  161          161  571 !    3            3  371 !   21           21  303 !  109          109  269 !
  23        23   309  227  133  119 !   32           32  570 !   69           69  368 !  134          134  303 !  160          160  266 !
  24        24   437  123  146   43 !   33           33  570 !  205          205  368 !   20           20  298 !  210          210  263 !
  25        25     1  216  309  139 !   41           41  570 !   84           84  361 !   18           18  294 !   18           18  260 !
  26        26   432    8  225  230 !  123          123  569 !  126          126  358 !   19           19  290 !  131          131  258 !
  27        27   -25  214   28  114 !   30           30  565 !  128          128  354 !  144          144  283 !  104          104  254 !
  28        28   409  135  156  253 !   69           69  564 !  167          167  351 !   89           89  264 !   28           28  253 !
  29        29   468  329   85  -11 !   54           54  562 !  109          109  350 !  182          182  262 !  146          146  253 !
  30        30   565   56  141    4 !  117          117  561 !  194          194  347 !    5            5  260 !   69           69  252 !
  31        31   541  223  133   89 !  146          146  553 !   34           34  345 !   10           10  260 !  163          163  252 !
  32        32   570  192  128  247 !   42           42  549 !  118          118  342 !   45           45  260 !    7            7  250 !
  33        33   570   18  153  -30 !   70           70  548 !  112          112  341 !  155          155  258 !   32           32  247 !
  34        34   499  345  110  178 !  152          152  546 !   44           44  340 !  145          145  253 !  123          123  244 !
  35        35   321  244  150  172 !   55           55  545 !  123          123  338 !   78           78  248 !   47           47  242 !
  36        36   670   51  190  184 !   72           72  545 !   61           61  337 !  185          185  245 !   67           67  241 !
  37        37   447  216  134  -18 !   84           84  545 !   29           29  329 !  202          202  238 !   45           45  240 !
  38        38   382  213  211  337 !  126          126  542 !   96           96  329 !  139          139  234 !  182          182  239 !
  39        39   488  484  139  209 !   31           31  541 !  207          207  329 !  193          193  232 !  124          124  236 !
  40        40   533  258  117   14 !   83           83  540 !  186          186  327 !  103          103  230 !  165          165  234 !
  41        41   570  112  148    3 !  125          125  540 !    4            4  326 !  197          197  230 !  169          169  234 !
  42        42   549   79  129  173 !  210          210  534 !   56           56  326 !   26           26  225 !   61           61  232 !
  43        43   485  313  131  -37 !   40           40  533 !   54           54  323 !   53           53  219 !   26           26  230 !
  44        44   529  340  144   41 !  108          108  533 !  108          108  320 !   95           95  217 !  120          120  230 !
  45        45   455  -42  260  240 !   64           64  532 !   19           19  319 !  104          104  215 !   57           57  228 !
  46        46   408  136  185  -87 !  208          208  531 !   43           43  313 !  135          135  215 !  159          159  228 !
  47        47   594  233  136  242 !  148          148  530 !  103          103  313 !  165          165  215 !   54           54  226 !
  48        48   122  217  322   86 !   44           44  529 !  197          197  313 !  169          169  215 !  117          117  225 !
  49        49   317  242  171  177 !   59           59  529 !  120          120  311 !  113          113  214 !  142          142  225 !
  50        50   367  304   78  -28 !  163          163  526 !  175          175  311 !  175          175  212 !   84           84  224 !
  51        51   166  182   58  -14 !   60           60  523 !   90           90  307 !   38           38  211 !   60           60  223 !
```

52	52	507	446	128	132 !	142	142	521 !	50	50	304 !	111	111	211 !	89	89	222 !
53	53	398	29	219	156 !	67	67	514 !	209	209	296 !	156	156	209 !	152	152	221 !
54	54	562	323	129	226 !	183	183	513 !	215	215	296 !	215	215	208 !	58	58	214 !
55	55	545	394	131	206 !	209	209	512 !	88	88	291 !	159	159	206 !	108	108	212 !
56	56	599	326	128	281 !	124	124	510 !	214	214	290 !	119	119	205 !	199	199	[illegible] !
57	57	666	188	169	228 !	52	52	507 !	119	119	289 !	79	79	204 !	39	39	209 !
58	58	497	465	135	214 !	62	62	504 !	14	14	284 !	127	127	201 !	55	55	206 !
59	59	529	18	161	-140 !	68	68	502 !	129	129	284 !	178	178	195 !	133	133	204 !
60	60	523	426	133	223 !	66	66	501 !	148	148	284 !	154	154	192 !	126	126	201 !
61	61	575	337	121	232 !	147	147	501 !	40	40	258 !	214	214	192 !	91	91	199 !
62	62	504	-34	70	44 !	153	153	501 !	104	104	257 !	122	122	191 !	148	148	193 !
63	63	462	-7	124	-10 !	34	34	499 !	75	75	249 !	36	36	190 !	107	107	188 !
64	64	532	247	124	-1 !	58	58	497 !	149	149	248 !	14	14	186 !	130	130	188 !
65	65	465	19	96	172 !	39	39	488 !	64	64	247 !	105	105	186 !	162	162	188 !
66	66	501	-13	176	-196 !	91	91	488 !	8	8	246 !	46	46	185 !	171	171	188 !
67	67	514	414	136	241 !	107	107	486 !	35	35	244 !	211	211	184 !	183	183	188 !
68	68	502	240	132	-6 !	130	130	486 !	80	80	244 !	200	200	182 !	139	139	187 !
69	69	564	368	138	252 !	162	162	486 !	99	99	244 !	15	15	179 !	127	127	185 !
70	70	548	417	147	278 !	43	43	485 !	101	101	244 !	90	90	179 !	36	36	184 !
71	71	465	33	164	-41 !	167	167	482 !	137	137	244 !	66	66	176 !	186	186	184 !
72	72	545	404	144	279 !	127	127	475 !	98	98	243 !	153	153	176 !	34	34	178 !
73	73	404	214	141	351 !	141	141	475 !	49	49	242 !	158	158	176 !	49	49	177 !
74	74	440	-29	79	125 !	168	168	475 !	95	95	242 !	49	49	171 !	42	42	173 !
75	75	440	249	117	367 !	29	29	468 !	68	68	240 !	57	57	169 !	35	35	172 !
76	76	-32	220	307	125 !	96	96	468 !	113	113	238 !	129	129	169 !	65	65	172 !
77	77	-2	207	377	110 !	207	207	468 !	134	134	237 !	188	188	168 !	80	80	172 !
78	78	-22	217	248	170 !	211	211	468 !	18	18	235 !	163	163	165 !	99	99	172 !
79	79	86	201	204	76 !	135	135	466 !	47	47	233 !	22	22	164 !	101	101	172 !
80	80	321	244	150	172 !	65	65	465 !	213	213	232 !	71	71	164 !	137	137	172 !
81	81	92	215	350	153 !	71	71	465 !	94	94	230 !	125	125	163 !	154	154	171 !
82	82	105	190	350	107 !	118	118	464 !	200	200	229 !	179	179	163 !	78	78	[illegible] !
83	83	540	4	141	-42 !	63	63	462 !	92	92	228 !	59	59	161 !	164	164	170 !
84	84	545	361	128	224 !	89	89	460 !	100	100	228 !	181	181	161 !	141	141	166 !
85	85	411	5	150	287 !	112	112	460 !	172	172	228 !	4	4	160 !	168	168	166 !
86	86	700	144	156	35 !	119	119	460 !	191	191	228 !	109	109	159 !	5	5	165 !
87	87	417	29	152	299 !	194	194	459 !	23	23	227 !	117	117	158 !	15	15	164 !
88	88	699	291	147	120 !	128	128	456 !	144	144	225 !	28	28	156 !	179	179	163 !
89	89	460	-46	264	222 !	45	45	455 !	2	2	224 !	86	86	156 !	4	4	158 !
90	90	612	307	179	153 !	160	160	450 !	114	114	224 !	33	33	153 !	138	138	157 !
91	91	488	-30	140	199 !	188	188	449 !	198	198	224 !	152	152	153 !	53	53	156 !
92	92	399	228	139	361 !	37	37	447 !	31	31	223 !	87	87	152 !	81	81	153 !
93	93	395	139	145	354 !	74	74	440 !	182	182	221 !	35	35	150 !	90	90	153 !
94	94	149	230	113	61 !	75	75	440 !	11	11	220 !	80	80	150 !	144	144	152 !
95	95	399	242	217	-44 !	1	1	438 !	21	21	220 !	85	85	150 !	156	156	151 !
96	96	468	329	85	-11 !	24	24	437 !	76	76	220 !	98	98	150 !	21	21	150 !
97	97	325	171	21	1 !	26	26	432 !	140	140	220 !	99	99	150 !	213	213	147 !
98	98	205	243	150	77 !	136	136	423 !	145	145	220 !	101	101	150 !	129	129	143 !
99	99	321	244	150	172 !	138	138	420 !	204	204	219 !	102	102	150 !	155	155	141 !
100	100	399	228	139	361 !	193	193	419 !	20	20	218 !	137	137	150 !	25	25	139 !
101	101	321	244	150	172 !	87	87	417 !	212	212	218 !	41	41	148 !	3	3	136 !
102	102	714	204	150	102 !	85	85	411 !	13	13	217 !	106	106	148 !	202	202	135 !
103	103	402	313	230	-114 !	28	28	409 !	48	48	217 !	70	70	147 !	174	174	134 !
104	104	369	257	215	254 !	215	215	409 !	78	78	217 !	88	88	147 !	52	52	132 !
105	105	616	55	186	-84 !	46	46	408 !	202	202	217 !	110	110	147 !	145	145	131 !
106	106	572	386	148	293 !	205	205	406 !	10	10	216 !	150	150	147 !	185	185	131 !
107	107	486	506	140	188 !	9	9	405 !	25	25	216 !	24	24	146 !	2	2	[illegible] !
108	108	533	320	142	212 !	73	73	404 !	37	37	216 !	93	93	145 !	14	14	127 !
109	109	577	350	159	269 !	181	181	403 !	133	133	216 !	44	44	144 !	74	74	125 !
110	110	574	390	147	294 !	103	103	402 !	81	81	215 !	72	72	144 !	76	76	125 !
111	111	382	213	211	337 !	197	197	402 !	185	185	215 !	121	121	144 !	204	204	123 !

```
112      112  460  341  129 -104 !   92       92  399 !   27       27  214 !  138      138  143 !  212      212  123 !
113      113  385  238  214  302 !   95       95  399 !   73       73  214 !  108      108  142 !  140      140  122 !
114      114  -35  224  368   96 !  100      100  399 !   38       38  213 !  161      161  142 !   10       10  121 !
115      115  105  210  326   57 !  191      191  399 !  111      111  213 !   30       30  141 !   20       20  120 !
116      116  161  191  108   40 !   53       53  398 !  165      165  211 !   73       73  141 !   88       88  120 !
117      117  561   21  158  225 !  214      214  397 !  169      169  211 !   83       83  141 !   23       23  119 !
118      118  464  342  126  -82 !   93       93  395 !  177      177  211 !   91       91  140 !   27       27  114 !
119      119  460  289  205 -127 !    3        3  393 !  192      192  211 !  107      107  140 !  180      180  113 !
120      120  574  311  130  230 !  159      159  392 !  196      196  211 !  162      162  140 !   13       13  111 !
121      121  598  131  144   -2 !  171      171  391 !    5        5  210 !  206      206  140 !   77       77  110 !
122      122  623   -9  191 -175 !  113      113  385 !  115      115  210 !   39       39  139 !  134      134  110 !
123      123  569  338  137  244 !  175      175  384 !   12       12  209 !   92       92  139 !   11       11  109 !
124      124  510  458  138  236 !  189      189  384 !   16       16  209 !  100      100  139 !   12       12  107 !
125      125  540  155  163  -15 !  173      173  383 !  166      166  209 !  130      130  139 !   82       82  107 !
126      126  542  358  135  201 !   38       38  382 !   77       77  207 !  191      191  139 !  132      132  107 !
127      127  475  429  201  185 !  111      111  382 !  154      154  207 !   69       69  138 !  166      166  103 !
128      128  456  354  124  -98 !    7        7  377 !  157      157  206 !  124      124  138 !  195      195  103 !
129      129  672  284  169  143 !   17       17  372 !  170      170  206 !  123      123  137 !  102      102  102 !
130      130  486  492  139  188 !  143      143  372 !  203      203  206 !  167      167  137 !   16       16  101 !
131      131  590   67  127  258 !  199      199  370 !  171      171  205 !   47       47  136 !   22       22   99 !
132      132  105  190  350  107 !  104      104  369 !  102      102  204 !   67       67  136 !  114      114   96 !
133      133  131  216   -5  204 !   50       50  367 !   79       79  201 !  180      180  136 !  157      157   96 !
134      134  129  237  303  110 !  200      200  359 !  139      139  200 !   58       58  135 !  170      170   96 !
135      135  466  -11  215  -36 !  164      164  357 !   15       15  199 !  126      126  135 !  177      177   96 !
136      136  423  132  132  325 !    6        6  356 !  176      176  198 !   37       37  134 !  192      192   96 !
137      137  321  244  150  172 !   97       97  325 !  195      195  198 !   23       23  133 !  196      196   96 !
138      138  420   60  143  157 !   35       35  321 !  190      190  196 !   31       31  133 !  198      198   96 !
139      139   19  200  234  187 !   80       80  321 !  201      201  196 !   60       60  133 !  203      203   96 !
140      140  -32  220  323  122 !   99       99  321 !  187      187  194 !  210      210  133 !  176      176   95 !
141      141  475  -36   86  166 !  101      101  321 !   32       32  192 !   68       68  132 !  201      201   94 !
142      142  521   -9  102  225 !  137      137  321 !  116      116  191 !  136      136  132 !  151      151   92 !
143      143  372  169   80  -51 !   49       49  317 !   82       82  190 !    3        3  131 !   31       31   89 !
144      144  145  225  283  152 !   22       22  310 !  132      132  190 !   43       43  131 !  205      205   87 !
145      145  -26  220  253  131 !   23       23  309 !  179      179  190 !   55       55  131 !   48       48   86 !
146      146  553  375  130  253 !    4        4  304 !   57       57  188 !  120      120  130 !  187      187   84 !
147      147  501  403  106   22 !  206      206  291 !  164      164  188 !  146      146  130 !    1        1   77 !
148      148  530  284  124  193 !   19       19  248 !    6        6  187 !   42       42  129 !   98       98   77 !
149      149  123  248   44   43 !  186      186  227 !   51       51  182 !   54       54  129 !   79       79   76 !
150      150  574  390  147  294 !   98       98  205 !  156      156  181 !  112      112  129 !  190      190   76 !
151      151   65  173    1   92 !  174      174  200 !  184      184  176 !   32       32  128 !  209      209   73 !
152      152  546  381  153  221 !   18       18  174 !  180      180  175 !   52       52  128 !   94       94   61 !
153      153  501  -13  176 -196 !  154      154  172 !  151      151  173 !   56       56  128 !  206      206   58 !
154      154  172  207  192  171 !  184      184  171 !   97       97  171 !   84       84  128 !  115      115   57 !
155      155  114  132  258  141 !  172      172  167 !   17       17  169 !  131      131  127 !  208      208   47 !
156      156  130  181  209  151 !   51       51  166 !  143      143  169 !  183      183  127 !    8        8   45 !
157      157  -61  206  -87   96 !  116      116  161 !  125      125  155 !  118      118  126 !   62       62   44 !
158      158  660   20  176  -97 !   15       15  151 !    9        9  154 !   63       63  124 !   24       24   43 !
159      159  392   -8  206  228 !   94       94  149 !   86       86  144 !   64       64  124 !  149      149   43 !
160      160  450    2   92  266 !  144      144  145 !  174      174  140 !  128      128  124 !   44       44   41 !
161      161  571   24  142   29 !  213      213  145 !   93       93  139 !  148      148  124 !  116      116   40 !
162      162  486  506  140  188 !    5        5  143 !   46       46  136 !   61       61  121 !   86       86   35 !
163      163  526  428  165  252 !  133      133  131 !   28       28  135 !   40       40  117 !  172      172   30 !
164      164  357  188   79  170 !  156      156  130 !  136      136  132 !   75       75  117 !  161      161   29 !
165      165    4  211  215  234 !  134      134  129 !  155      155  132 !   94       94  113 !  147      147   22 !
166      166  -55  209  -55  103 !    8        8  124 !  121      121  131 !  189      189  111 !   40       40   14 !
167      167  482  351  137   -5 !  149      149  123 !   24       24  123 !  194      194  111 !  173      173   12 !
168      168  475  -36   86  166 !   48       48  122 !  206      206  116 !    7        7  110 !   30       30    4 !
169      169    4  211  215  234 !  187      187  118 !   41       41  112 !   34       34  110 !   41       41    3 !
170      170  -61  206  -87   96 !  155      155  114 !  181      181  107 !  116      116  108 !   97       97    1 !
171      171  391  205  359  188 !   82       82  105 !   22       22  104 !  199      199  107 !   64       64   -1 !
```

```
172        172  167  228   45   30 !  115      115  105 !  173      173   98 !  147      147  106 !  121      121   -2 !
173        173  383   98   38   12 !  132      132  105 !  189      189   96 !  208      208  103 !  167      167   -5 !
174        174  200  140  -30  134 !   81       81   92 !  188      188   91 !  142      142  102 !  214      214   -5 !
175        175  384  311  212  -41 !  190      190   92 !    7        7   80 !  187      187  100 !   68       68   -6 !
176        176  -25  198   -8   95 !  180      180   91 !   42       42   79 !  205      205   97 !    6        6 [illegible] !
177        177  -19  211  428   96 !   79       79   86 !  131      131   67 !   65       65   96 !   19       19  -10 !
178        178  627  -11  195 -191 !  151      151   65 !  183      183   61 !  160      160   92 !   63       63  -10 !
179        179   56  190  163  163 !  202      202   60 !  210      210   61 !    6        6   86 !   29       29  -11 !
180        180   91  175  136  113 !  179      179   56 !  138      138   60 !  141      141   86 !   96       96  -11 !
181        181  403  107  161  -23 !   10       10   43 !   30       30   56 !  168      168   86 !  207      207  -11 !
182        182   24  221  262  239 !  185      185   39 !  105      105   55 !   29       29   85 !   51       51  -14 !
183        183  513   61  127  188 !  195      195   28 !   36       36   51 !   96       96   85 !  125      125  -15 !
184        184  171  176   26  -18 !  182      182   24 !  199      199   42 !  207      207   85 !   37       37  -18 !
185        185   39  215  245  131 !  201      201   23 !  211      211   39 !   17       17   80 !  184      184  -18 !
186        186  227  327   48  184 !   14       14   22 !   71       71   33 !  143      143   80 !  189      189  -22 !
187        187  118  194  100   84 !   21       21   20 !   53       53   29 !   74       74   79 !  181      181  -23 !
188        188  449   91  168  -56 !  139      139   19 !   87       87   29 !  164      164   79 !   50       50  -28 !
189        189  384   96  111  -22 !    2        2   10 !  161      161   24 !   50       50   78 !   33       33  -30 !
190        190   92  196  309   76 !  165      165    4 !  117      117   21 !   62       62   70 !  135      135  -36 !
191        191  399  228  139  361 !  169      169    4 !  193      193   21 !    9        9   64 !   43       43  -37 !
192        192  -19  211  428   96 !   25       25    1 !  158      158   20 !   51       51   58 !   71       71  -41 !
193        193  419   21  232  278 !   11       11    0 !   65       65   19 !    8        8   52 !  175      175  -41 !
194        194  459  347  111  -70 !   77       77   -2 !   33       33   18 !  209      209   51 !   83       83  -42 !
195        195   28  198  -29  103 !  204      204  -11 !   59       59   18 !  186      186   48 !   95       95  -44 !
196        196  -19  211  428   96 !  177      177  -19 !   26       26    8 !  172      172   45 !   17       17  -51 !
197        197  402  313  230 -114 !  192      192  -19 !   85       85    5 !  149      149   44 !  143      143  -51 !
198        198  -35  224  368   96 !  196      196  -19 !   83       83    4 !  213      213   40 !  188      188  -56 !
199        199  370   42  107  211 !   16       16  -20 !  160      160    2 !  173      173   38 !  194      194  -70 !
200        200  359  229  182  282 !   78       78  -22 !   63       63   -7 !   27       27   28 !  215      215  -70 !
201        201   23  196  402   94 !   27       27  -25 !  159      159   -8 !  184      184   26 !  118      118  -82 !
202        202   60  217  238  135 !  176      176  -25 !  122      122   -9 !   97       97   21 !  105      105 [illegible] !
203        203  -61  206  -87   96 !   13       13  -26 !  142      142   -9 !    1        1   12 !   46       46  -87 !
204        204  -11  219  327  123 !  145      145  -26 !  135      135  -11 !  151      151    1 !  158      158  -97 !
205        205  406  368   97   87 !  212      212  -29 !  178      178  -11 !   13       13   -2 !  128      128  -98 !
206        206  291  116  140   58 !   76       76  -32 !   66       66  -13 !  133      133   -5 !  112      112 -104 !
207        207  468  329   85  -11 !  140      140  -32 !  153      153  -13 !  176      176   -8 !  103      103 -114 !
208        208  531  392  103   47 !  114      114  -35 !   74       74  -29 !  195      195  -29 !  197      197 -114 !
209        209  512  296   51   73 !  198      198  -35 !   91       91  -30 !  174      174  -30 !  211      211 -125 !
210        210  534   61  133  263 !   20       20  -36 !   62       62  -34 !   12       12  -46 !  119      119 -127 !
211        211  468   39  184 -125 !   12       12  -46 !  141      141  -36 !  166      166  -55 !   59       59 -140 !
212        212  -29  218  349  123 !  166      166  -55 !  168      168  -36 !   16       16  -63 !  122      122 -175 !
213        213  145  232   40  147 !  157      157  -61 !   45       45  -42 !  157      157  -87 !  178      178 -191 !
214        214  397  290  192   -5 !  170      170  -61 !   89       89  -46 !  170      170  -87 !   66       66 -196 !
215        215  409  296  208  -70 !  203      203  -61 !    1        1  -76 !  203      203  -87 !  153      153 -196 !
```

```
  215   40MT:Reference streams, all taxa, 1990
DECORANA OPTIONS -- DOWNWEIGHTING 0   RESCALING  4   ANALYSIS 0   SEGMENTS 26   THRESHOLD  0.00
TRANSFORMATION          0.00    0.00

SAMPLE SCORES - WHICH ARE WEIGHTED MEAN SPECIES SCORES

   N    NAME    AX1  AX2  AX3  AX4 !      RANKED 1      !      RANKEO 2      !      RANKEO 3      !      RANKEO 4      !
                                   !     EIG=0.897      !     EIG=0.565      !     EIG=0.342      !     EIG=0.263      !
   1    WISC    470  434  136  176 !  13   BIGS   679 !   1   WISC   434 !  38   OFAL   328 !  12   ODEL   271 !
   2    SEYM    470  232  141   95 !   8   NFTE   561 !  21   PINE   362 !  35   LARB   272 !   7   WALD   203 !
   3    ROAR    454  277  130   36 !  18   FOUR   550 !   7   WALD   298 !  36   BOXE   228 !  16   ELKC   195 !
   4    STON    521  280  141  150 !  24   TENO   543 !   4   STON   280 !  37   HANG   210 !   8   NFTE   194 !
   5    EFBU    532  252  138  153 !   6   SFFL   541 !   3   ROAR   277 !  10   BENH   202 !   1   WISC   176 !
   6    SFFL    541  141  132  176 !   9   SFSU   541 !  18   FOUR   274 !  15   BHFT   191 !   6   SFFL   176 !
   7    WALO    523  298  139  203 !   5   EFBU   532 !   5   EFBU   252 !  32   POPA   184 !  21   PINE   169 !
   8    NFTE    561  237  134  194 !  19   WFST   525 !  28   BATA   239 !  34   REDW   183 !  34   REDW   158 !
   9    SFSU    541  187  135  155 !  20   BOUL   524 !   8   NFTE   237 !  40   BIGO   176 !   9   SFSU   155 !
  10    BENH    449   25  202  149 !   7   WALD   523 !  29   BATB   237 !  31   TULE   175 !  39   TONG   155 !
  11    ARMS    340  148  137   35 !   4   STON   521 !  34   REDW   236 !  24   TEND   158 !  26   WGAL   154 !
  12    ODEL    406  113  136  271 !  22   CALF   489 !  39   TONG   235 !  13   BIGS   157 !   5   EFBU   153 !
  13    BIGS    679  175  157   92 !  17   LFRO   488 !  17   LFRO   233 !  22   CALF   156 !  32   POPA   152 !
  14    BH34    428    0   68   91 !  21   PINE   482 !   2   SEYM   232 !  39   TONG   152 !   4   STON   150 !
  15    BHFT    389  206  191    0 !  25   BIGC   478 !  35   LARB   217 !  16   ELKC   151 !  40   BIGO   150 !
  16    ELKC    391  153  151  195 !   1   WISC   470 !  37   HANG   217 !  23   CROO   144 !  10   BENH   149 !
  17    LFRO    488  233  130   69 !   2   SEYM   470 !  36   BOXE   214 !   2   SEYM   141 !  31   TULE   144 !
  18    FOUR    550  274  141  130 !  26   WGAL   459 !  31   TULE   211 !   4   STON   141 !  18   FOUR   130 !
  19    WFST    525  159  134  113 !   3   ROAR   454 !  38   OFAL   211 !  18   FOUR   141 !  27   LFRC   125 !
  20    BOUL    524  188  135  118 !  10   BENH   449 !  30   WILL   208 !  26   WGAL   140 !  37   HANG   124 !
  21    PINE    482  362  136  169 !  23   CROO   441 !  32   POPA   208 !   7   WALO   139 !  28   BATA   121 !
  22    CALF    489  116  156   31 !  14   BH34   428 !  15   BHFT   206 !   5   EFBU   138 !  33   POPB   121 !
  23    CROO    441  167  144   30 !  12   ODEL   406 !  33   POPB   198 !  25   BIGC   138 !  38   OFAL   119 !
  24    TEND    543  113  158   44 !  16   ELKC   391 !  27   LFRC   196 !  11   ARMS   137 !  20   BOUL   118 !
  25    BIGC    478  189  138   49 !  15   BHFT   389 !  25   BIGC   189 !   1   WISC   136 !  35   LARB   117 !
  26    WGAL    459   51  140  154 !  40   BIGO   360 !  20   BOUL   188 !  12   ODEL   136 !  19   WFST   113 !
  27    LFRC     99  196  117  125 !  11   ARMS   340 !   9   SFSU   187 !  21   PINE   136 !  30   WILL   107 !
  28    BATA    107  239  101  121 !  39   TONG   306 !  13   BIGS   175 !   9   SFSU   135 !  36   BOXE   102 !
  29    BATB    118  237  132   97 !  33   POPB   170 !  40   BIGO   171 !  20   BOUL   135 !  29   BATB    97 !
  30    WILL      0  208    0  107 !  32   POPA   159 !  23   CROO   167 !   8   NFTE   134 !   2   SEYM    95 !
  31    TULE     47  211  175  144 !  29   BATB   118 !  19   WFST   159 !  19   WFST   134 !  13   BIGS    92 !
  32    POPA    159  208  184  152 !  28   BATA   107 !  16   ELKC   153 !   6   SFFL   132 !  14   BH34    91 !
  33    POPB    170  198  130  121 !  27   LFRC    99 !  11   ARMS   148 !  29   BATB   132 !  17   LFRO    69 !
  34    REOW     84  236  183  158 !  36   BOXE    97 !   6   SFFL   141 !   3   ROAR   130 !  25   BIGC    49 !
  35    LARB     24  217  272  117 !  34   REDW    84 !  22   CALF   116 !  17   LFRO   130 !  24   TEND    44 !
  36    BOXE     97  214  228  102 !  31   TULE    47 !  12   ODEL   113 !  33   POPB   130 !   3   ROAR    36 !
  37    HANG     31  217  210  124 !  37   HANG    31 !  24   TEND   113 !  27   LFRC   117 !  11   ARMS    35 !
  38    OFAL     19  211  328  119 !  35   LARB    24 !  26   WGAL    51 !  28   BATA   101 !  22   CALF    31 !
  39    TONG    306  235  152  155 !  38   OFAL    19 !  10   BENH    25 !  14   BH34    68 !  23   CROO    30 !
  40    BIGO    360  171  176  150 !  30   WILL     0 !  14   BH34     0 !  30   WILL     0 !  15   BHFT     0 !
```

```
SCATTER DIAGRAM OF ORDINATION, AXES      1      2

     SPECIES                                    SAMPLES
 5   - - - - - - - - - - - 2 - - - - -       5  - - - - - - - - - - - - - -
     - - - - - - - - - - - 3 1 - - - -          - - - - - - - - - - - - - -
 4   - - - - - - - - - - - 1 7 - - - -       4  - - - - - - - - - 1 - - - -
     - - - - - - - - - 1 1 2 5 6 - - -          - - - - - - - - - 1 - - - -
 3   - - - - - - 2 - 1 2 2 8 2 5 1 - -       3  - - - - - - - - - - - - - -
     - - 1 - - - - - - 2 1 1 3 - - 2 -          - - - - - - - - - 1 3 1 - -
 2   41710 310 3 1 - 7 9 3 - 3 1 - - 1       2  5 2 2 1 - - 1 1 - 2 - 1 - -
     - 1 2 4 4 4 - - 1 4 1 - 1 1 - 1 -          - 1 - 1 - - - 2 1 1 3 - - 1
 1   - - - - 1 - 1 1 1 1 5 - - 2 - - 1       1  - - - - - - 1 - 1 1 2 - - -
     - - - - - - - - - 3 2 - 3 2 1 1 -          - - - - - - - - - 1 - - - -
 -   - - - - - - - - - 2 4 4 2 3 - 1 -       -  - - - - - - - - 2 - - - - -
     - - - - - - - - - 1 1 7 4 - 2 - -          - - - - - - - - - - - - - -
-1   - - - - - - - - - - 1 - - - - - -      -1  - - - - - - - - - - - - - -

    -1   0   1   2   3   4   5   6   7          0   1   2   3   4   5   6


SCATTER DIAGRAM OF ORDINATION, AXES      1      3

     SPECIES                                    SAMPLES
 4   - 3 1 - - - - - - - - - - - - - -       4  - - - - - - - - - - - - - -
     - 3 1 1 2 - - - - 1 - - - - - - -          - - - - - - - - - - - - - -
 3   - 4 3 1 3 - - - - - - - - - - - -       3  1 - - - - - - - - - - - - -
     - 2 2 - 3 1 1 - - - - 2 - - - - -          1 - - - - - - - - - - - - -
 2   - 1 4 2 1 - - - - 8 5 3 - - - - -       2  1 1 - - - - - - 1 - - - - -
     - - 1 1 - 2 1 - 8 2 6 2 6 3 4 4 2          1 1 - 1 - - 1 3 - 1 1 - - 1
 1   - - - 1 2 1 - 1 1 8 6142317 - 1 -       1  - 1 2 1 - - 1 - 2 7 7 2 - -
     - - - - 1 1 - - - 5 3 7 2 - - - -          - - - - - - - - 1 - - - - -
 -   - 1 - 1 2 2 1 - 1 1 1 - - - - - -       -  1 - - - - - - - - - - - - -
     - 3 1 - 1 - 1 - - - - - - - - - -          - - - - - - - - - - - - - -
-1   4 1 - - - - - - - - - - - - - - -      -1  - - - - - - - - - - - - - -

    -1   0   1   2   3   4   5   6   7          0   1   2   3   4   5   6
```

```
SCATTER DIAGRAM OF ORDINATION, AXES     1     4

     SPECIES                                         SAMPLES
     - - - - - - - - - 4 2 - - - - - -                - - - - - - - - - - - - - -
  3  - - - - - - - - - 3 2 - - - - - -             3  - - - - - - - - - - - - - -
     - - - - - 1 - - - 3 4 1 4 8 - - -                - - - - - - - - 1 - - - - -
  2  - - 3 - 1 - - - - 2 1 4 9 7 - 1 -             2  - - - - - - - - - - 1 - - -
     - 1 2 2 3 2 1 - 7 3 1 9 3 - 1 1 -                - 1 - 1 - - 1 2 - 3 4 1 - -
  1  111 7 2 5 - 1 - 1 1 1 - 1 - - 2 1             1  5 2 1 1 - - - - 1 - 2 1 - -
     3 6 1 3 4 - 1 1 1 - 2 - 2 - - - -                - - 1 - - - - - 1 2 - - - 1
  -  - - - - 2 2 - - 1 1 1 - 5 3 - - 1             -  - - - - - - 1 1 1 3 1 - - -
     - - - - - 2 1 - - 6 2 8 4 2 - - -                - - - - - - - - - - - - - -
 -1  - - - - - - - - - 2 3 3 - - 1 1 -            -1  - - - - - - - - - - - - - -
     - - - - - - - - - - 2 3 1 - - - -                - - - - - - - - - - - - - -
 -2  - - - - - - - - - - - - 2 - 2 - -            -2  - - - - - - - - - - - - - -

   -1   0   1   2   3   4   5   6   7                 0   1   2   3   4   5   6


SCATTER DIAGRAM OF ORDINATION, AXES     2     3

     SPECIES                                         SAMPLES
  4  - - - - - 1 3 - - - - - -                     4  - - - - - - - - -
     - - - - - 2 6 - - - - - -                        - - - - - - - - -
  3  - - - - - 110 - - - - - -                     3  - - - - 1 - - - -
     - 2 - - 1 - 7 - 1 - - - -                        - - - - 1 - - - -
  2  - 2 3 - - 111 3 3 - 1 - -                     2  1 - - - 2 - - - -
     - 4 8 3 5 410 3 2 2 1 - -                        - - 2 3 5 - - - -
  1  - 3 3 8 6 412 31212 6 4 2                     1  - 1 3 7 5 5 - 1 1
     - 4 2 - - 6 1 1 4 1 - - -                        1 - - - - - - - -
  -  1 - - 1 - 3 4 - 1 - - - -                     -  - - - - 1 - - - -
     - - - - 1 2 3 - - - - - -                        - - - - - - - - -
 -1  - - - - - - 5 - - - - - -                    -1  - - - - - - - - -

   -1   0   1   2   3   4   5                         0   1   2   3   4
```

470	434	136	176
470	232	141	95
454	277	130	36
521	280	141	150
532	252	138	153
541	141	132	176
523	298	139	203
561	237	134	194
541	187	135	155
449	25	202	149
340	148	137	35
406	113	136	271
679	175	157	92
428	0	68	91
389	206	191	0
391	153	151	195
488	233	130	69
550	274	141	130
525	159	134	113
524	188	135	118
482	362	136	169
489	116	156	31
441	167	144	30
543	113	158	44
478	189	138	49
459	51	140	154
99	196	117	125
107	239	101	121
118	237	132	97
0	208	0	107
47	211	175	144
159	208	184	152
170	198	130	121
84	236	183	158
24	217	272	117
97	214	228	102
31	217	210	124
19	211	328	119
306	235	152	155
360	171	176	150

TAXA LIST
1990 Montana Reference Streams, Demonstration Projects and Clark Fork River Basin.

MISCELLANEOUS TAXA (NON-INSECTS)

- *Porifera
- **Hydra*
- *Turbellaria
- *Nematoda
- *Oligochaeta
    - Lumbriculidae
    - Enchytraeidae
    - Naididae
        - *Chaetogaster diaphanus*
        - *Nais communis*
        - *Nais variabilis*
        - *Ophidonais serpentina*
    - Tubificidae-immature
    - *Lumbricina*
- *Hirudinea
- *Sphaeriidae
    - *Pisidium*
    - *Pisidium compressum*
    - *Pisidium milium*
    - *Sphaerium*
    - *Sphaerium simile*
- *Ancylidae
    - **Ferrissia*
    - *Ferrissia parallelus*
    - *Ferrissia rivularis*
- *Lymnaeidae
    - **Fossaria*
    - *Fossaria bulimoides cockerelli*
    - *Fossaria modicella*
    - **Stagnicola*
    - *Stagnicola elrodi*
- *Physidae
    - **Physella*
    - *Physella gyrina*
    - *Physella lordi*
    - *Physella propinqua nuttalli*
- *Planorbidae
    - *Gyraulus*
    - *Gyraulus parvus*
    - *Planorbella subcrenatum*
- *Cladocera
- *Copepoda
- *Ostracoda
- Gammaridae
    - **Gammarus*
    - *Gammarus lacustris*

TAXA LIST CONT.

Talitridae
- **Hyallela azteca*
Isopoda
- **Caecidotea*
- *Caecidotea racovitzai racovitzai*
Decapoda
- **Pacifasticus*
*Acari

ODONATA

*Gomphidae
- *Octogomphus*
- *Ophiogomphus*
*Libellulidae
*Coenagrionidae
- *Argia*
- *Coenagrion/Enallagma*
*Lestidae

EPHEMEROPTERA

Baetidae (RBP 3 level I.D. to genus)
- *Acentrella*
- *Acentrella turbida*
- *Baetis bicaudatus*
- *Baetis insignificans*
- *Baetis tricaudatus*
- *Callibaetis*
- *Centroptilum*
- *Diphetor hageni*
Caenidae
- **Caenis*
- *Caenis latipennis*
- *Caenis youngi*
Ephemerellidae (RBP3 level I.D. to species when possible)
- *Attenella*
- *Attenella margarita*
- *Caudatella*
- *Caudatella edmundsi*
- *Caudatella hystrix*
- *Drunella*
- *Drunella coloradensis*
- *Drunella doddsi*
- *Drunella grandis*
- *Drunella spinifera*
- *Ephemerella*
- *Ephemerella aurivillii*
- *Ephemerella inermis*
- *Serratella tibialis*
- *Timpanoga hecuba*

TAXA LIST CONT.

Heptageniidae
- **Cinygma*
- **Cinygmula*
- **Epeorus (RBP 3 level I.D. to species when possible)*
- **Epeorus albertae*
- **Epeorus deceptivus*
- **Epeorus grandis*
- **Heptagenia*
- **Nixe*
- **Rhithrogena*
- **Stenonema*

Leptophlebiidae
- **Choroterpes*
- **Leptophlebia*
- **Paraleptophlebia*
- **Paraleptophlebia bicornuta*

Oligoneuridae
- **Isonychia*

Siphlonuridae
- **Ameletus*
- **Siphlonurus*

Tricorythidae
- **Tricorythodes minutus*

PLECOPTERA

*Capniidae

*Chloroperlidae
- **Kathroperla perdita*
- **Sweltsa*

*Leuctridae
- *Paraleuctra*

*Nemouridae
- **Malenka*
- **Visoka cataractae*
- **Zapada*
- **Zapada cinctipes*
- **Zapada columbiana*
- **Zapada Oregonensis Group*

*Perlidae
- **Calineuria californica*
- **Claassenia sabulosa*
- **Doroneuria*
- **Hesperoperla pacifica*

*Perlodidae
- **Isogenoides*
- **Isoperla*
- **Kogotus*
- **Megarcys*
- **Setvena*
- **Skwala*

TAXA LIST CONT.

Peltoperlidae
- **Yoraperla*

Pteronarcidae
- **Pteronarcella*
- **Pteronarcella badia*
- **Pteronarcys californica*

*Taeniopterygidae

HEMIPTERA

*Belastomatidae
- **Lethocerus*

*Corixidae
- *Palmacorixa*
- *Palmacorixa buenoi*
- *Palmacorixa gillettei*
- *Sigara*
- *Trichocorixa*
- *Trichocorixa borealis*
- *Trichocorixa verticalis interiores*
- *Trichocorixa naias*
- *Trichocorixa verticalis*

Gerridae
- **Gerris*

Mesoveliidae
- **Mesovelia*

*Naucoridae
- **Ambrysus*

*Notonectidae
- **Notonecta*

MEGALOPTERA

- **Sialis*

TRICHOPTERA

Arctopsychidae
- **Arctopsyche grandis*
- **Parapsyche*
- **Parapsyche elsis*

Brachycentridae
- **Amiocentrus aspilus*
- **Brachycentrus*
- **Brachycentrus americanus*
- **Brachycentrus occidentalis*
- **Micrasema*

Glossosomatidae
- **Agapetus*
- *Agapetus montanus*
- **Anagapetus*

TAXA LIST CONT

- **Glossosoma*
- *Glossosoma traviatum*
- *Glossosoma velona*
- **Protoptila*

Helicopsychidae
- **Helicopsyche borealis*

Hydropsychidae
- **Cheumatopsyche*
- **Hydropsyche*
- *Hydropsyche bronta*
- *Hydropsyche cockerelli*
- *Hydropsyche morosa*
- *Hydropsyche occidentalis*
- *Hydropsyche oslari*
- *Hydropsyche slossonae*
- *Hydropsyche tana*

*Hydroptilidae
- **Agraylea*
- **Hydroptila*
- **Ithytrichia*
- *Ithytrichia clavata*
- **Leucotrichia*
- **Mayatrichia*
- **Neotrichia*
- **Ochrotrichia*
- **Oxyethira*
- **Zumatrichia ?notosa*

Lepidostomatidae
- **Lepidostoma*
- *Lepidostoma-panel case*
- *Lepidostoma-sand case*
- *Lepidostoma-turret case*

Leptoceridae
- **Ceraclea*
- **Mystacides*
- **Nectopcyche*
- **Oecetis*
- **Triaenodes*

Limnephilidae
- **Apatania*
- **Chyranda centralis*
- **Cryptochia*
- **Dicosmoecus*
- *Dicosmoecus atripes*
- **Ecclisomyia*
- **Hesperophylax*
- **Homophylax*
- **Onocosmoecus*
- **Psychoglypha bella*

Philopotamidae
- **Dolophilodes*
- **Wormaldia*

TAXA LIST CONT.

*Phryganeidae
Polycentropodidae
    **Polycentropus*
Psychomyiidae
    **Psychomyia*
    Psychomyia flavida
Rhyacophilidae-RBP3 level I.D. to species or Group if possible
    Rhyacophila
    Rhyacophila Alberta Group
    Rhyacophila Angelita Group
    Rhyacophila Betteni Group
    Rhyacophila Brunnea Group
    Rhyacophila Coloradensis Group
    Rhyacophila coloradensis
    Rhyacophila Hyalinata Group
    Rhyacophila Iranda Group
    Rhyacophila narvae
    Rhyacophila pellisa
    Rhyacophila Sibirica Group
    Rhyacophila Vemna Group
    Rhyacophila verrula
    Rhyacophila Vofixa Group
Uenoidae
    **Neophylax*
    Neophylax rickeri
    **Neothremma*
    Neothremma alicia
    **Oligophlebodes*

LEPIDOPTERA

Pyralidae
    **Petrophila*

COLEOPTERA

*Dytiscidae
    Agabus
    Deronectes
    Oreodytes
Elmidae-RBP 3 level I.D. to genus
    Cleptelmis
    Cleptelmis ornata
    Dubraphia
    Heterlimnius
    Heterlimnius corpulentus
    Lara avara
    Narpus
    Narpus concolor
    Optioservus
    Optioservus divergens

TAXA LIST CONT.

- *Optioservus quadrimaculatus*
- *Optioservus seriatus*
- *Stenelmis*
- *Zaitzevia*
- *Zaitzevia parvula*

Gyrinidae
- **Gyrinus*

*Haliplidae
- *Brychius*
- *Haliplus*
- *Peltodytes*

*Hydrophilidae
- *Berosus*
- *Hydrochus*

MISCELLANEOUS DIPTERA

Athericidae
- **Atherix*

*Blephariceridae
- *Bibiocephala grandis*

*Brachycera-unknown larvae and pupae
*Ceratopogonidae
*Culicidae
- *Aedes*
- *Anopheles*

*Dolichopodidae
Empididae-RBP 3 level I.D. for larvae to genus
- *Chelifera*
- *Clinocera*
- *Hemerodromia*
- *Oreogeton*

Muscidae
- **Limnophora*

*Pelecorhynchidae
Psychodidae
- **Pericoma*

*Simuliidae
- *Prosimulium*
- *Simulium*

*Stratiomyiidae
*Tabanidae
*Tanyderidae
Tipulidae-RBP 3 level I.D. for larvae to genus
- *Antocha*
- *Dicranota*
- *Hexatoma*
- *?Ormosia*
- *Pedicia*
- *Tipula*

TAXA LIST CONT.

DIPTERA-CHIRONOMIDAE-RBP 3 level I.D. typically to genus

Ablabesmyia
Acricotopus
Apedilum
Brillia
Cardiocladius
Chaetocladius
Chironomus
Cladotanytarsus
Conchapelopia/Thienemannimyia
Corynoneura
Cricotopus
Cricotopus Cricotopus
Cricotopus Isocladius
**Cricotopus Nostococladius*
Cricotopus Tremulus Group
Cricotopus Trifascia Group
Cryptochironomus
Cryptotendipes
Diamesa
Dicrotendipes
Demicryptochironomus
Endochironomus
Eukiefferiella
Glyptotendipes
Hydrobaenus
Labrundinia
Larsia
Micropsectra
Microtendipes
Nanocladius
Orthocladius
Pagastia
Parachironomus
Parakiefferiella
Paralauterborniella
Parametriocnemus
Parphaenocladius
Paratanytarsus
Paratendipes
Pentaneura
Phaenopsectra
Polypedilum
Potthastia
Potthastia Gaedii Group
Potthastia Longimana Group
Procladius
Psectrocladius
Psectrotanypus
Pseudochironomus

TAXA LIST CONT.

Rheocricotopus
Rheotanytarsus
Saetheria
Stempellinella
Stictochironomus
Stilocladius
Sublettea
Sympotthastia
Synorthocladius
Tanypus
Tanytarsus
Thienemanniella
Thienemannimyia
Tvetenia
Zavrelimyia

* Indicates the level of taxonomic resolution recommended for Rapid Bioassessment Protocol III. See text for further discussion.

INDIVIDUAL SITE METRICS

Rapid Bioassessment Protocol III

File: CVSITMET

All metrics computed for each individual site/sample are listed on the following pages. Metric summaries by region are provided elsewhere.

Most of the metrics listed are self-explanatory or are explained in Plafkin et al. (1989). Attribute values for taxa, used in the calculation of these metrics, are listed and explained in the Metric Program Appendix.

The 1992 version of the metric program has added the Baetidae/Ephemeroptera ratio.

For the Biotic Condition Index (Winget & Mangum, 1979), only the CTQa and CTQd are calculated. It is necessary to input physical and chemical information about the site, in order to compute the actual BCI. The CTQa and CTQd by themselves, operate like other saprobic indices (e.g. Hilsenhoff Biotic Index).

The Community Voltinism Analysis lists the abundance and percent of taxa in each of three categories:

Multivoltine	>1 generation per year
Univoltine	1 generation per year
Semivoltine	>1 year per generation

Indicator Assemblages were not used for the 1990 Reference Stream and Demonstration Projects.

Each site metric summary comprises a separate file. File names are listed on a following page. Some of the more recent printouts have the file name listed in the header at the top of the page. These files are Word Perfect 5.1 files.

METRIC SUMMARY

Armstrong Spring Creek, Sample 1, July 11, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 2546
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 820

TOTAL NUMBER OF TAXA = 24
Number EPT taxa = 7

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	8	706	27.71
Odonata	0	0	.00
Ephemeroptera	3	500	19.64
Plecoptera	0	0	.00
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	4	320	12.56
Lepidoptera	0	0	.00
Coleoptera	1	24	.94
Misc. Diptera	2	20	.79
Chironomidae	6	976	38.33

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = .84
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	1	24	.94
Parasite	1	4	.16
Collector-gatherer	14	1690	66.35
Collector-filterer	2	28	1.10
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	2	288	11.31
Scraper	1	8	.31
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	2	500	19.64
Unknown	1	4	.16

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = .29
Scraper/(Scraper + C.-filterer) = .22
Shredder/Total organisms = .000

```
Armstrong Spring Creek, Sample 1, July 11, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Baetis tricaudatus              492   19.32
Eukiefferiella                  476   18.70
Pagastia                        440   17.28
Physella                        326   12.80
Hydroptila                      276   10.84
SUBTOTAL 5 DOMINANTS           2010   78.94
Caecidotea                      148    5.81
Turbellaria                     108    4.24
Gammarus                         52    2.04
Stagnicola                       36    1.41
Hirudinea                        24     .94
TOTAL 10 DOMINANTS             2378   93.38

SAPROBIC INDICES
Hilsenhoff Biotic Index             =   5.73
Biotic Condition Index
   Community Tolerance Quotient (a) =  89.04
   Community Tolerance Quotient (d) = 132.00

DIVERSITY MEASURES
Shannon H (loge) =  2.26
Shannon H (log2) =  3.26
Evenness         =   .71
Brillouin H      =  2.24
Simpson D        =   .14

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine      1420     55.77
Univoltine        1074     42.18
Semivoltine         52      2.04

INDICATOR ASSEMBLAGES
ASSEMBLAGE              ABUNDANCE     PERCENT
  A                            0          .00
  B                            0          .00
  C                            0          .00
  D                            0          .00
  E                            0          .00
  F                            0          .00
  G                            0          .00
  H                            0          .00
  I                            0          .00
  J                            0          .00

 End of report.
```

METRIC SUMMARY

Armstrong Springs Creek, Veg. Sample, July 11, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 880
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 478

TOTAL NUMBER OF TAXA = 22
Number EPT taxa = 6

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	6	252	28.63
Odonata	0	0	.00
Ephemeroptera	3	438	49.78
Plecoptera	0	0	.00
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	3	40	4.54
Lepidoptera	0	0	.00
Coleoptera	0	0	.00
Misc. Diptera	3	34	3.87
Chironomidae	7	116	13.18

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 4.12
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	0	0	.00
Parasite	0	0	.00
Collector-gatherer	13	752	85.46
Collector-filterer	4	48	5.46
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	1	26	2.95
Scraper	0	0	.00
Shredder	2	6	.68
Xylophage	0	0	.00
Omnivore	2	48	5.45
Unknown	0	0	.00

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = .00
Scraper/(Scraper + C.-filterer) = .00
Shredder/Total organisms = .007

```
Armstrong Springs Creek, Veg. Sample, July 11, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Baetis tricaudatus            434     49.32
Physella                      132     15.00
Caecidotea                     54      6.14
Orthocladius                   44      5.00
Eukiefferiella                 36      4.09
SUBTOTAL 5 DOMINANTS          700     79.55
Oligochaeta                    34      3.86
Simulium                       30      3.41
Hydroptila                     26      2.95
Gammarus                       20      2.27
Pagastia                       14      1.59
TOTAL 10 DOMINANTS            824     93.63

SAPROBIC INDICES
Hilsenhoff Biotic Index             =   6.28
Biotic Condition Index
   Community Tolerance Quotient (a) =  91.64
   Community Tolerance Quotient (d) = 158.00

DIVERSITY MEASURES
Shannon H (loge) =  1.90
Shannon H (log2) =  2.74
Evenness         =   .61
Brillouin H      =  1.85
Simpson D        =   .28

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine      438     49.77
Univoltine        413     46.93
Semivoltine        29      3.30

INDICATOR ASSEMBLAGES
ASSEMBLAGE              ABUNDANCE    PERCENT
  A                             0        .00
  B                             0        .00
  C                             0        .00
  D                             0        .00
  E                             0        .00
  F                             0        .00
  G                             0        .00
  H                             0        .00
  I                             0        .00
  J                             0        .00

 End of report.
```

METRIC SUMMARY

Battle Creek north of Chinook, 02-1A, August 21, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 3076
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 620

TOTAL NUMBER OF TAXA = 41
Number EPT taxa = 11

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	15	1340	43.55
Odonata	1	60	1.95
Ephemeroptera	5	340	11.05
Plecoptera	0	0	.00
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	6	280	9.10
Lepidoptera	0	0	.00
Coleoptera	3	16	.52
Misc. Diptera	4	88	2.86
Chironomidae	7	952	30.96

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = .65
Hydropsychidae/Total Trichoptera = .91

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	8	229	7.44
Parasite	1	80	2.60
Collector-gatherer	17	2050	66.65
Collector-filterer	5	401	13.03
Macrophyte-herbivore	1	4	.13
Piercer-herbivore	2	12	.39
Scraper	4	192	6.24
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	2	8	.26
Unknown	1	100	3.25

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = .48
Scraper/(Scraper + C.-filterer) = .32
Shredder/Total organisms = .000

Battle Creek north of Chinook, 02-1A, August 21, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA

TAXON	ABUNDANCE	PERCENT
Micropsectra	624	20.29
Hyallela azteca	512	16.64
Caenis	252	8.19
Oligochaeta	248	8.06
Physella	248	8.06
SUBTOTAL 5 DOMINANTS	1884	61.24
Cheumatopsyche	236	7.67
Tanytarsus	109	3.54
Paratanytarsus	100	3.25
Gyraulus	80	2.60
Acari	80	2.60
TOTAL 10 DOMINANTS	2489	80.90

SAPROBIC INDICES
Hilsenhoff Biotic Index = 6.72
Biotic Condition Index
Community Tolerance Quotient (a) = 94.68
Community Tolerance Quotient (d) = 158.00

DIVERSITY MEASURES
Shannon H (loge) = 2.74
Shannon H (log2) = 3.95
Evenness = .74
Brillouin H = 2.70
Simpson D = .10

COMMUNITY VOLTINISM ANALYSIS

TYPE	ABUNDANCE	PERCENT
Multivoltine	964	31.34
Univoltine	1960	63.72
Semivoltine	152	4.94

INDICATOR ASSEMBLAGES

ASSEMBLAGE	ABUNDANCE	PERCENT
A	0	.00
B	0	.00
C	0	.00
D	0	.00
E	0	.00
F	0	.00
G	0	.00
H	0	.00
I	0	.00
J	0	.00

End of report.

METRIC SUMMARY

Battle Creek north of Chinook, 02-1B, August 21, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 1116
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 480

TOTAL NUMBER OF TAXA = 27
Number EPT taxa = 9

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	8	328	29.41
Odonata	1	84	7.53
Ephemeroptera	5	92	8.24
Plecoptera	0	0	.00
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	4	388	34.77
Lepidoptera	0	0	.00
Coleoptera	2	20	1.79
Misc. Diptera	1	8	.72
Chironomidae	6	196	17.57

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 2.45
Hydropsychidae/Total Trichoptera = .95

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	6	112	10.05
Parasite	1	28	2.51
Collector-gatherer	9	440	39.43
Collector-filterer	5	416	37.28
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	1	8	.72
Scraper	3	84	7.53
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	1	4	.36
Unknown	1	24	2.15

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = .20
Scraper/(Scraper + C.-filterer) = .17
Shredder/Total organisms = .000

```
Battle Creek north of Chinook, 02-1B, August 21, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                              ABUNDANCE PERCENT
Cheumatopsyche                          368    32.97
Physella                                164    14.70
Micropsectra                            128    11.47
Coenagrion/Enallagma                     84     7.53
Hyallela azteca                          60     5.38
SUBTOTAL 5 DOMINANTS                    804    72.05
Ferrissia                                56     5.02
Caenis                                   44     3.94
Tanytarsus                               32     2.87
Acari                                    28     2.51
Stenonema                                24     2.15
TOTAL 10 DOMINANTS                      988    88.54

SAPROBIC INDICES
Hilsenhoff Biotic Index                      =   6.42
Biotic Condition Index
   Community Tolerance Quotient (a) =  94.48
   Community Tolerance Quotient (d) = 192.00

DIVERSITY MEASURES
Shannon H (loge) =  2.35
Shannon H (log2) =  3.39
Evenness         =   .71
Brillouin H      =  2.30
Simpson D        =   .16

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine        312    27.96
Univoltine          784    70.25
Semivoltine          20     1.79

INDICATOR ASSEMBLAGES
ASSEMBLAGE                 ABUNDANCE     PERCENT
  A                                0         .00
  B                                0         .00
  C                                0         .00
  D                                0         .00
  E                                0         .00
  F                                0         .00
  G                                0         .00
  H                                0         .00
  I                                0         .00
  J                                0         .00

 End of report.
```

METRIC SUMMARY

Battle Creek north of Chinook, 02-3 Veg., August 21, 1990 .

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 1512
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 36

TOTAL NUMBER OF TAXA = 19
Number EPT taxa = 1

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	12	1128	74.60
Odonata	1	68	4.50
Ephemeroptera	1	36	2.38
Plecoptera	0	0	.00
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	0	0	.00
Lepidoptera	0	0	.00
Coleoptera	0	0	.00
Misc. Diptera	1	12	.79
Chironomidae	4	268	17.72

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = .13
Hyd./Total Tri. undefined - Total Tri. = 0

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	2	80	5.29
Parasite	1	12	.79
Collector-gatherer	9	968	64.02
Collector-filterer	3	40	2.64
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	0	0	.00
Scraper	3	324	21.43
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	0	0	.00
Unknown	1	88	5.82

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 8.10
Scraper/(Scraper + C.-filterer) = .89
Shredder/Total organisms = .000

```
Battle Creek north of Chinook, 02-3 Veg., 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Physella                      348     23.02
Hyallela azteca               228     15.08
Gyraulus                      200     13.23
Micropsectra                  156     10.32
Oligochaeta                   128      8.47
SUBTOTAL 5 DOMINANTS         1060     70.12
Paratanytarsus                 88      5.82
Ferrissia                      76      5.03
Coenagrionidae                 68      4.50
Ostracoda                      56      3.70
Planorbella                    48      3.17
TOTAL 10 DOMINANTS           1396     92.34

SAPROBIC INDICES
Hilsenhoff Biotic Index             =   7.31
Biotic Condition Index
   Community Tolerance Quotient (a) = 106.00
   Community Tolerance Quotient (d) = 152.00

DIVERSITY MEASURES
Shannon H (loge) =  2.37
Shannon H (log2) =  3.42
Evenness         =   .80
Brillouin H      =  2.34
Simpson D        =   .12

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine      289     19.11
Univoltine       1155     76.39
Semivoltine        68      4.50

INDICATOR ASSEMBLAGES
ASSEMBLAGE              ABUNDANCE    PERCENT
  A                            0         .00
  B                            0         .00
  C                            0         .00
  D                            0         .00
  E                            0         .00
  F                            0         .00
  G                            0         .00
  H                            0         .00
  I                            0         .00
  J                            0         .00

 End of report.
```

METRIC SUMMARY

Ben Hart Spring Creek, RBP5, July 16, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

```
TOTAL ABUNDANCE =   2476
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance =   1912

TOTAL NUMBER OF TAXA =   31
Number EPT taxa =   17

TAXONOMIC GROUP COMPOSITION
GROUP            #TAXA ABUNDANCE PERCENT
Misc. Taxa          4       60     2.42
Odonata             0        0      .00
Ephemeroptera       8      804    32.46
Plecoptera          0        0      .00
Hemiptera           0        0      .00
Megaloptera         0        0      .00
Trichoptera         9     1108    44.73
Lepidoptera         0        0      .00
Coleoptera          1      100     4.04
Misc. Diptera       2       44     1.78
Chironomidae        7      360    14.53

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae                 =   5.31
Hydropsychidae/Total Trichoptera =    .00

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION
GROUP                #TAXA  ABUNDANCE PERCENT
Predator                3        52      2.10
Parasite                0         0       .00
Collector-gatherer     19      1000     40.37
Collector-filterer      1         4       .16
Macrophyte-herbivore    0         0       .00
Piercer-herbivore       1        36      1.45
Scraper                 4      1112     44.90
Shredder                0         0       .00
Xylophage               0         0       .00
Omnivore                3       272     10.98
Unknown                 0         0       .00

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer        =  278.00
Scraper/(Scraper + C.-filterer)   =    1.00
Shredder/Total organisms          =    .000
```

```
Ben Hart Spring Creek, RBP5, July 16, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Agapetus                        724    29.24
Baetis tricaudatus              276    11.15
Glossosoma                      240     9.69
Eukiefferiella                  208     8.40
Ephemerella inermis             156     6.30
SUBTOTAL 5 DOMINANTS           1604    64.78
Tricorythodes minutus           152     6.14
Heptagenia                      140     5.65
Heterlimnius                    100     4.04
Pagastia                         64     2.58
Diphetor hageni                  60     2.42
TOTAL 10 DOMINANTS             2120    85.61

SAPROBIC INDICES
Hilsenhoff Biotic Index              =   2.87
Biotic Condition Index
   Community Tolerance Quotient (a) =  70.13
   Community Tolerance Quotient (d) = 111.00

DIVERSITY MEASURES
Shannon H (loge) =  2.52
Shannon H (log2) =  3.63
Evenness         =   .73
Brillouin H      =  2.49
Simpson D        =   .13

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine       549    22.17
Univoltine        1741    70.32
Semivoltine        186     7.51

INDICATOR ASSEMBLAGES
ASSEMBLAGE              ABUNDANCE    PERCENT
  A                            0         .00
  B                            0         .00
  C                            0         .00
  D                            0         .00
  E                            0         .00
  F                            0         .00
  G                            0         .00
  H                            0         .00
  I                            0         .00
  J                            0         .00

 End of report.
```

METRIC SUMMARY

Ben Hart Spring Creek, Veg. Sample, July 28, 1990

Montana, RBP Benthic Macroinvertebrate Sample.
File: 90BHVFC

TOTAL ABUNDANCE = 154
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 75

TOTAL NUMBER OF TAXA = 20
Number EPT taxa = 8

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	4	8	5.20
Odonata	0	0	.00
Ephemeroptera	5	66	42.86
Plecoptera	0	0	.00
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	3	9	5.85
Lepidoptera	0	0	.00
Coleoptera	2	4	2.60
Misc. Diptera	1	5	3.25
Chironomidae	5	62	40.26

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 1.21
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	3	4	2.60
Parasite	0	0	.00
Collector-gatherer	10	94	61.05
Collector-filterer	1	5	3.25
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	0	0	.00
Scraper	2	3	1.95
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	3	46	29.87
Unknown	1	2	1.30

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = .60
Scraper/(Scraper + C.-filterer) = .38
Shredder/Total organisms = .000

```
Ben Hart Spring Creek, Veg. Sample, July 28, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Eukiefferiella                   40     25.97
Baetis tricaudatus               23     14.94
Ephemerella inermis              21     13.64
Diphetor hageni                  13      8.44
Tricorythodes minutus             8      5.19
SUBTOTAL 5 DOMINANTS            105     68.18
Thienemanniella                   8      5.19
Orthocladius                      6      3.90
Pagastia                          6      3.90
Brachycentrus occidentalis        5      3.25
Simuliidae                        5      3.25
TOTAL 10 DOMINANTS              135     87.67

SAPROBIC INDICES
Hilsenhoff Biotic Index             =   5.05
Biotic Condition Index
   Community Tolerance Quotient (a) =  83.50
   Community Tolerance Quotient (d) = 264.00

DIVERSITY MEASURES
Shannon H (loge) =  2.43
Shannon H (log2) =  3.50
Evenness         =   .81
Brillouin H      =  2.23
Simpson D        =   .12

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine       75      48.70
Univoltine         67      43.51
Semivoltine        12       7.79

INDICATOR ASSEMBLAGES
ASSEMBLAGE              ABUNDANCE    PERCENT
  A                            0         .00
  B                            0         .00
  C                            0         .00
  D                            0         .00
  E                            0         .00
  F                            0         .00
  G                            0         .00
  H                            0         .00
  I                            0         .00
  J                            0         .00

 End of report.
```

METRIC SUMMARY

Big Creek, July 26, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 285
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 241

TOTAL NUMBER OF TAXA = 29
Number EPT taxa = 20

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	1	2	.70
Odonata	0	0	.00
Ephemeroptera	9	224	78.59
Plecoptera	3	5	1.75
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	8	12	4.20
Lepidoptera	0	0	.00
Coleoptera	1	2	.70
Misc. Diptera	0	0	.00
Chironomidae	7	40	14.02

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 6.03
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	7	9	3.15
Parasite	0	0	.00
Collector-gatherer	11	174	61.04
Collector-filterer	0	0	.00
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	1	2	.70
Scraper	7	82	28.76
Shredder	1	2	.70
Xylophage	0	0	.00
Omnivore	2	16	5.61
Unknown	0	0	.00

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filter undefined - Coll.-Filt.=0
Scraper/(Scraper + C.-filterer) = 1.00
Shredder/Total organisms = .007

```
Big Creek, July 26, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                      ABUNDANCE PERCENT
Baetis tricaudatus                81    28.42
Cinygmula                         39    13.68
Serratella tibialis               29    10.18
Epeorus albertae                  22     7.72
Drunella coloradensis             21     7.37
SUBTOTAL 5 DOMINANTS             192    67.37
Orthocladius                      17     5.96
Ameletus                          16     5.61
Eukiefferiella                    15     5.26
Epeorus longimanus                11     3.86
Glossosoma                         4     1.40
TOTAL 10 DOMINANTS               255    89.46

SAPROBIC INDICES
Hilsenhoff Biotic Index                =   3.60
Biotic Condition Index
   Community Tolerance Quotient (a) =  48.41
   Community Tolerance Quotient (d) =  87.00

DIVERSITY MEASURES
Shannon H (loge) =  2.46
Shannon H (log2) =  3.55
Evenness         =   .73
Brillouin H      =  2.31
Simpson D        =   .13

COMMUNITY VOLTINISM ANALYSIS
TYPE           ABUNDANCE PERCENT
Multivoltine         92    32.54
Univoltine          183    64.47
Semivoltine           8     2.98

INDICATOR ASSEMBLAGES
ASSEMBLAGE                 ABUNDANCE     PERCENT
  A                                0         .00
  B                                0         .00
  C                                0         .00
  D                                0         .00
  E                                0         .00
  F                                0         .00
  G                                0         .00
  H                                0         .00
  I                                0         .00
  J                                0         .00

 End of report.
```

METRIC SUMMARY

Big Hole River above Hwy 34, July 23, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 1828
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 480

TOTAL NUMBER OF TAXA = 39
Number EPT taxa = 21

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	3	1066	58.32
Odonata	0	0	.00
Ephemeroptera	9	198	10.85
Plecoptera	4	30	1.65
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	8	252	13.80
Lepidoptera	0	0	.00
Coleoptera	3	78	4.27
Misc. Diptera	3	24	1.32
Chironomidae	9	180	9.86

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 2.67
Hydropsychidae/Total Trichoptera = .30

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	5	36	1.98
Parasite	0	0	.00
Collector-gatherer	16	254	13.92
Collector-filterer	6	1180	64.56
Macrophyte-herbivore	1	2	.11
Piercer-herbivore	0	0	.00
Scraper	5	258	14.12
Shredder	1	8	.44
Xylophage	0	0	.00
Omnivore	5	90	4.94
Unknown	0	0	.00

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = .22
Scraper/(Scraper + C.-filterer) = .18
Shredder/Total organisms = .004

```
Big Hole River above Hwy 34, July 23, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Porifera                       1060   57.99
Glossosoma                      138    7.55
Hydropsyche                      74    4.05
Polypedilum                      50    2.74
Serratella tibialis              46    2.52
SUBTOTAL 5 DOMINANTS           1368   74.85
Nixe                             46    2.52
Zaitzevia parvula                42    2.30
Epeorus albertae                 36    1.97
Rheotanytarsus                   36    1.97
Tvetenia                         36    1.97
TOTAL 10 DOMINANTS             1564   85.58

SAPROBIC INDICES
Hilsenhoff Biotic Index             =   3.42
Biotic Condition Index
   Community Tolerance Quotient (a) =  68.55
   Community Tolerance Quotient (d) = 129.00

DIVERSITY MEASURES
Shannon H (loge) =  1.96
Shannon H (log2) =  2.83
Evenness         =   .54
Brillouin H      =  1.91
Simpson D        =   .35

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine      181      9.90
Univoltine        993     54.32
Semivoltine       654     35.78

INDICATOR ASSEMBLAGES
ASSEMBLAGE              ABUNDANCE    PERCENT
  A                             0        .00
  B                             0        .00
  C                             0        .00
  D                             0        .00
  E                             0        .00
  F                             0        .00
  G                             0        .00
  H                             0        .00
  I                             0        .00
  J                             0        .00

 End of report.
```

METRIC SUMMARY

Big Hole River at Fishtrap, July 23, 1990

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 3936
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 2032

TOTAL NUMBER OF TAXA = 40
Number EPT taxa = 21

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	3	88	2.23
Odonata	0	0	.00
Ephemeroptera	9	616	15.65
Plecoptera	4	32	.80
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	8	1384	35.15
Lepidoptera	0	0	.00
Coleoptera	2	192	4.88
Misc. Diptera	3	112	2.85
Chironomidae	11	1512	38.40

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 1.34
Hydropsychidae/Total Trichoptera = .90

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	5	144	3.65
Parasite	1	56	1.42
Collector-gatherer	15	1512	38.41
Collector-filterer	6	1312	33.33
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	2	200	5.08
Scraper	4	368	9.34
Shredder	1	8	.20
Xylophage	0	0	.00
Omnivore	6	336	8.53
Unknown	0	0	.00

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = .28
Scraper/(Scraper + C.-filterer) = .22
Shredder/Total organisms = .002

```
Big Hole River at Fishtrap, July 23, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                          ABUNDANCE PERCENT
Hydropsyche                       1192     30.28
Tvetenia                           792     20.12
Eukiefferiella                     232      5.89
Nixe                               208      5.28
Orthocladius                       184      4.67
SUBTOTAL 5 DOMINANTS              2608     66.24
Tricorythodes minutus              136      3.46
Optioservus                        128      3.25
Cricotopus Nostococladius          128      3.25
Baetis tricaudatus                 112      2.85
Hydroptila                          72      1.83
TOTAL 10 DOMINANTS                3184     80.88

SAPROBIC INDICES
Hilsenhoff Biotic Index                  =   4.55
Biotic Condition Index
   Community Tolerance Quotient (a) =  76.68
   Community Tolerance Quotient (d) = 137.00

DIVERSITY MEASURES
Shannon H (loge) =  2.57
Shannon H (log2) =  3.71
Evenness         =   .70
Brillouin H      =  2.55
Simpson D        =   .15

COMMUNITY VOLTINISM ANALYSIS
TYPE         ABUNDANCE PERCENT
Multivoltine     1656     42.07
Univoltine       2036     51.73
Semivoltine       244      6.20

INDICATOR ASSEMBLAGES
ASSEMBLAGE                ABUNDANCE     PERCENT
  A                               0         .00
  B                               0         .00
  C                               0         .00
  D                               0         .00
  E                               0         .00
  F                               0         .00
  G                               0         .00
  H                               0         .00
  I                               0         .00
  J                               0         .00

 End of report.
```

METRIC SUMMARY

Big Spring Creek below State Hatchery, July 25, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 5456
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 5216

TOTAL NUMBER OF TAXA = 25
Number EPT taxa = 11

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	5	104	1.92
Odonata	0	0	.00
Ephemeroptera	4	512	9.39
Plecoptera	1	24	.44
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	6	4680	85.79
Lepidoptera	0	0	.00
Coleoptera	1	16	.29
Misc. Diptera	4	56	1.03
Chironomidae	4	64	1.18

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 81.50
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	1	24	.44
Parasite	0	0	.00
Collector-gatherer	14	704	12.93
Collector-filterer	2	24	.44
Macrophyte-herbivore	1	288	5.28
Piercer-herbivore	0	0	.00
Scraper	3	96	1.76
Shredder	2	2784	51.03
Xylophage	0	0	.00
Omnivore	2	1536	28.16
Unknown	0	0	.00

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 4.00
Scraper/(Scraper + C.-filterer) = .80
Shredder/Total organisms = .510

```
Big Spring Creek below State Hatchery, July 25, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                          ABUNDANCE PERCENT
Lepidostoma-sand case larv    2760      50.59
Brachycentrus americanus      1528      28.01
Ephemerella inermis            376       6.89
Micrasema                      288       5.28
Baetis tricaudatus              96       1.76
SUBTOTAL 5 DOMINANTS          5048      92.53
Glossosoma                      72       1.32
Cladotanytarsus                 40        .73
Turbellaria                     32        .59
Physella                        32        .59
Acentrella turbida              32        .59
TOTAL 10 DOMINANTS            5256      96.35

SAPROBIC INDICES
Hilsenhoff Biotic Index                =   1.31
Biotic Condition Index
   Community Tolerance Quotient (a) =  71.36
   Community Tolerance Quotient (d) = 105.00

DIVERSITY MEASURES
Shannon H (loge) =  1.51
Shannon H (log2) =  2.18
Evenness         =   .47
Brillouin H      =  1.50
Simpson D        =   .34

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine      182      3.34
Univoltine       3710     68.00
Semivoltine      1564     28.67

INDICATOR ASSEMBLAGES
ASSEMBLAGE                  ABUNDANCE     PERCENT
  A                              0           .00
  B                              0           .00
  C                              0           .00
  D                              0           .00
  E                              0           .00
  F                              0           .00
  G                              0           .00
  H                              0           .00
  I                              0           .00
  J                              0           .00

End of report.
```

METRIC SUMMAR

Big Spring Creek below State Hatchery, Veg. Sample, July 25, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 684
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 572

TOTAL NUMBER OF TAXA = 13
Number EPT taxa = 5

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	4	78	11.40
Odonata	0	0	.00
Ephemeroptera	2	70	10.23
Plecoptera	0	0	.00
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	3	502	73.38
Lepidoptera	0	0	.00
Coleoptera	0	0	.00
Misc. Diptera	3	24	3.50
Chironomidae	1	10	1.46

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 57.20
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	1	2	.29
Parasite	0	0	.00
Collector-gatherer	6	148	21.63
Collector-filterer	2	22	3.21
Macrophyte-herbivore	1	70	10.23
Piercer-herbivore	0	0	.00
Scraper	0	0	.00
Shredder	1	354	51.75
Xylophage	0	0	.00
Omnivore	2	88	12.86
Unknown	0	0	.00

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = .00
Scraper/(Scraper + C.-filterer) = .00
Shredder/Total organisms = .518

```
Big Spring Creek below State Hatchery, Veg. Sample, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                          ABUNDANCE PERCENT
Lepidostoma-sand case larv     354       51.75
Brachycentrus americanus        78       11.40
Micrasema                       70       10.23
Physella                        62        9.06
Ephemerella inermis             52        7.60
SUBTOTAL 5 DOMINANTS           616       90.04
Prosimulium                     20        2.92
Baetis tricaudatus              18        2.63
Eukiefferiella                  10        1.46
Fossaria                         8        1.17
Turbellaria                      6         .88
TOTAL 10 DOMINANTS             678       99.10

SAPROBIC INDICES
Hilsenhoff Biotic Index                  =   2.06
Biotic Condition Index
   Community Tolerance Quotient (a) =  79.77
   Community Tolerance Quotient (d) = 113.00

DIVERSITY MEASURES
Shannon H (loge) =  1.64
Shannon H (log2) =  2.37
Evenness         =   .64
Brillouin H      =  1.60
Simpson D        =   .31

COMMUNITY VOLTINISM ANALYSIS
TYPE         ABUNDANCE PERCENT
Multivoltine       27     3.95
Univoltine        578    84.50
Semivoltine        79    11.55

INDICATOR ASSEMBLAGES
ASSEMBLAGE                  ABUNDANCE    PERCENT
  A                                 0        .00
  B                                 0        .00
  C                                 0        .00
  D                                 0        .00
  E                                 0        .00
  F                                 0        .00
  G                                 0        .00
  H                                 0        .00
  I                                 0        .00
  J                                 0        .00

 End of report.
```

METRIC SUMMARY

Boulder Creek, August 23, 1990.

Montana, RBProtocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 582
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 562

TOTAL NUMBER OF TAXA = 30
Number EPT taxa = 23

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	1	2	.34
Odonata	0	0	.00
Ephemeroptera	12	488	83.83
Plecoptera	7	52	8.93
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	4	22	3.78
Lepidoptera	0	0	.00
Coleoptera	1	2	.34
Misc. Diptera	1	2	.34
Chironomidae	4	14	2.40

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 40.14
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	7	52	8.93
Parasite	0	0	.00
Collector-gatherer	11	180	30.91
Collector-filterer	1	2	.34
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	0	0	.00
Scraper	6	326	56.01
Shredder	3	18	3.09
Xylophage	0	0	.00
Omnivore	1	2	.34
Unknown	1	2	.34

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 163.00
Scraper/(Scraper + C.-filterer) = .99
Shredder/Total organisms = .031

```
Boulder Creek  August 23, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Epeorus albertae              152     26.12
Baetis tricaudatus            100     17.18
Rhithrogena                    74     12.71
Cinygmula                      54      9.28
Epeorus longimanus             34      5.84
SUBTOTAL 5 DOMINANTS          414     71.13
Drunella coloradensis          24      4.12
Megarcys                       24      4.12
Drunella doddsi                22      3.78
Serratella tibialis            14      2.41
Zapada Oregonensis Gr.         12      2.06
TOTAL 10 DOMINANTS            510     87.62

SAPROBIC INDICES
Hilsenhoff Biotic Index              =   2.18
Biotic Condition Index
   Community Tolerance Quotient (a) =  44.50
   Community Tolerance Quotient (d) =  71.00

DIVERSITY MEASURES
Shannon H (loge) =  2.47
Shannon H (log2) =  3.56
Evenness         =   .73
Brillouin H      =  2.38
Simpson D        =   .13

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine       89     15.29
Univoltine        476     81.79
Semivoltine        17      2.92

INDICATOR ASSEMBLAGES
ASSEMBLAGE              ABUNDANCE    PERCENT
  A                             0        .00
  B                             0        .00
  C                             0        .00
  D                             0        .00
  E                             0        .00
  F                             0        .00
  G                             0        .00
  H                             0        .00
  I                             0        .00
  J                             0        .00

 End of report.
```

METRIC SUMMARY

Box Elder Creek, Riffle, July 18, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 314
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 172

TOTAL NUMBER OF TAXA = 27
Number EPT taxa = 10

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	3	7	2.24
Odonata	1	12	3.82
Ephemeroptera	6	122	38.86
Plecoptera	0	0	.00
Hemiptera	1	22	7.01
Megaloptera	1	3	.96
Trichoptera	4	50	15.92
Lepidoptera	1	1	.32
Coleoptera	1	1	.32
Misc. Diptera	0	0	.00
Chironomidae	9	96	30.57

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 1.79
Hydropsychidae/Total Trichoptera = .78

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	6	39	12.42
Parasite	0	0	.00
Collector-gatherer	10	121	38.54
Collector-filterer	4	43	13.70
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	0	0	.00
Scraper	3	82	26.12
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	2	3	.96
Unknown	2	26	8.28

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 1.91
Scraper/(Scraper + C.-filterer) = .66
Shredder/Total organisms = .000

```
Box Elder Creek, Riffle, July 18, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                          ABUNDANCE PERCENT
Stenonema                           79     25.16
Dicrotendipes                       34     10.83
Pseudochironomus                    31      9.87
Cheumatopsyche                      27      8.60
Caenis                              24      7.64
SUBTOTAL 5 DOMINANTS               195     62.10
Corixidae                           22      7.01
Coenagrionidae                      12      3.82
Hydropsyche                         12      3.82
Polycentropus                       10      3.18
Conchapelopia/Thienemannim          10      3.18
TOTAL 10 DOMINANTS                 261     83.11

SAPROBIC INDICES
Hilsenhoff Biotic Index                  =   6.09
Biotic Condition Index
   Community Tolerance Quotient (a) =  92.38
   Community Tolerance Quotient (d) = 179.00

DIVERSITY MEASURES
Shannon H (loge) =  2.62
Shannon H (log2) =  3.78
Evenness         =   .80
Brillouin H      =  2.48
Simpson D        =   .11

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine        94    30.10
Univoltine         218    69.59
Semivoltine          1      .32

INDICATOR ASSEMBLAGES
ASSEMBLAGE                  ABUNDANCE     PERCENT
  A                                0          .00
  B                                0          .00
  C                                0          .00
  D                                0          .00
  E                                0          .00
  F                                0          .00
  G                                0          .00
  H                                0          .00
  I                                0          .00
  J                                0          .00

 End of report.
```

METRIC SUMMARY

Box Elder Creek, Pool, July 18, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 475
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 45

TOTAL NUMBER OF TAXA = 24
Number EPT taxa = 6

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	3	10	2.10
Odonata	1	67	14.11
Ephemeroptera	3	37	7.79
Plecoptera	0	0	.00
Hemiptera	2	187	39.37
Megaloptera	1	2	.42
Trichoptera	3	8	1.68
Lepidoptera	0	0	.00
Coleoptera	1	5	1.05
Misc. Diptera	0	0	.00
Chironomidae	10	159	33.47

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = .28
Hydropsychidae/Total Trichoptera = .50

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	6	73	15.37
Parasite	0	0	.00
Collector-gatherer	8	176	37.05
Collector-filterer	2	7	1.47
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	0	0	.00
Scraper	2	10	2.10
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	3	20	4.21
Unknown	3	189	39.79

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 1.43
Scraper/(Scraper + C.-filterer) = .59
Shredder/Total organisms = .000

```
Box Elder Creek, Pool, July 18, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Corixidae                      186    39.16
Pseudochironomus               109    22.95
Coenagrionidae                  67    14.11
Callibaetis                     21     4.42
Dicrotendipes                   21     4.42
SUBTOTAL 5 DOMINANTS           404    85.06
Polypedilum                     16     3.37
Diphetor hageni                 14     2.95
Ferrissia                        8     1.68
Dubiraphia                       5     1.05
Cheumatopsyche                   4      .84
TOTAL 10 DOMINANTS             451    94.95

SAPROBIC INDICES
Hilsenhoff Biotic Index                =   7.19
Biotic Condition Index
   Community Tolerance Quotient (a) =  96.61
   Community Tolerance Quotient (d) = 170.00

DIVERSITY MEASURES
Shannon H (loge) =  1.91
Shannon H (log2) =  2.75
Evenness         =   .60
Brillouin H      =  1.83
Simpson D        =   .23

COMMUNITY VOLTINISM ANALYSIS
TYPE           ABUNDANCE PERCENT
Multivoltine       147     30.95
Univoltine         322     67.89
Semivoltine          5      1.16

INDICATOR ASSEMBLAGES
ASSEMBLAGE                  ABUNDANCE     PERCENT
  A                                0          .00
  B                                0          .00
  C                                0          .00
  D                                0          .00
  E                                0          .00
  F                                0          .00
  G                                0          .00
  H                                0          .00
  I                                0          .00
  J                                0          .00

 End of report.
```

METRIC SUMMARY

East Fork Bull River, Sept. 2, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 384
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 355

TOTAL NUMBER OF TAXA = 27
Number EPT taxa = 20

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	2	5	1.30
Odonata	0	0	.00
Ephemeroptera	9	298	77.60
Plecoptera	6	25	6.51
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	5	32	8.33
Lepidoptera	0	0	.00
Coleoptera	0	0	.00
Misc. Diptera	1	3	.78
Chironomidae	4	21	5.46

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 16.90
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	7	35	9.11
Parasite	0	0	.00
Collector-gatherer	7	99	25.77
Collector-filterer	1	3	.78
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	0	0	.00
Scraper	6	219	57.03
Shredder	3	22	5.73
Xylophage	0	0	.00
Omnivore	3	6	1.56
Unknown	0	0	.00

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 73.00
Scraper/(Scraper + C.-filterer) = .99
Shredder/Total organisms = .057

```
East Fork Bull River, Sept. 2, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                       ABUNDANCE PERCENT
Rhithrogena                      97     25.26
Epeorus grandis                  84     21.88
Drunella doddsi                  43     11.20
Baetis tricaudatus               35      9.11
Epeorus albertae                 29      7.55
SUBTOTAL 5 DOMINANTS            288     75.00
Parapsyche elsis                 17      4.43
Zapada columbiana                13      3.39
Tvetenia                          9      2.34
Rhyacophila Hyalinata Gr.         8      2.08
Cinygmula                         5      1.30
TOTAL 10 DOMINANTS              340     88.54

SAPROBIC INDICES
Hilsenhoff Biotic Index                 =   1.28
Biotic Condition Index
   Community Tolerance Quotient (a) =  45.52
   Community Tolerance Quotient (d) = 106.00

DIVERSITY MEASURES
Shannon H (loge) =  2.37
Shannon H (log2) =  3.42
Evenness         =   .72
Brillouin H      =  2.26
Simpson D        =   .14

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine       47     12.24
Univoltine        313     81.51
Semivoltine        24      6.25

INDICATOR ASSEMBLAGES
ASSEMBLAGE                  ABUNDANCE     PERCENT
  A                                0          .00
  B                                0          .00
  C                                0          .00
  D                                0          .00
  E                                0          .00
  F                                0          .00
  G                                0          .00
  H                                0          .00
  I                                0          .00
  J                                0          .00

 End of report.
```

METRIC SUMMARY

Calf Creek, Sept 6, 1990.

```
Montana, RBP Benthic Macroinvertebrate Sample.
File: 90CA2FFC


TOTAL ABUNDANCE =    456
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance =    244

TOTAL NUMBER OF TAXA =   44
Number EPT taxa =   25

TAXONOMIC GROUP COMPOSITION
GROUP              #TAXA ABUNDANCE PERCENT
Misc. Taxa             3         5    1.10
Odonata                0         0     .00
Ephemeroptera          9       134   29.39
Plecoptera             7        66   14.49
Hemiptera              0         0     .00
Megaloptera            0         0     .00
Trichoptera            9        44    9.67
Lepidoptera            0         0     .00
Coleoptera             3       137   30.04
Misc. Diptera          5        28    6.14
Chironomidae           8        42    9.21

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae                    =   5.81
Hydropsychidae/Total Trichoptera =       .00

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION
GROUP                  #TAXA  ABUNDANCE PERCENT
Predator                 12         69    15.16
Parasite                  1          3      .66
Collector-gatherer       17        221    48.45
Collector-filterer        3          9     1.98
Macrophyte-herbivore      0          0      .00
Piercer-herbivore         0          0      .00
Scraper                   5        106    23.26
Shredder                  3         34     7.46
Xylophage                 0          0      .00
Omnivore                  2         12     2.63
Unknown                   1          2      .44

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer          =   11.78
Scraper/(Scraper + C.-filterer)     =     .92
Shredder/Total organisms            =    .075
```

```
Calf Creek, Sept 6, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Heterlimnius                     93   20.39
Cinygmula                        60   13.16
Optioservus                      35    7.68
Zapada cinctipes                 28    6.14
Drunella grandis                 21    4.61
SUBTOTAL 5 DOMINANTS            237   51.98
Baetis                           15    3.29
Skwala                           15    3.29
Rhyacophila Brunnea Gr.          13    2.85
Paraleptophlebia                 12    2.63
Antocha                          11    2.41
TOTAL 10 DOMINANTS              303   66.45

SAPROBIC INDICES
Hilsenhoff Biotic Index             =   3.24
Biotic Condition Index
   Community Tolerance Quotient (a) =  55.98
   Community Tolerance Quotient (d) = 129.00

DIVERSITY MEASURES
Shannon H (loge) =  3.10
Shannon H (log2) =  4.48
Evenness         =   .82
Brillouin H      =  2.94
Simpson D        =   .08

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine        46    10.25
Univoltine         239    52.47
Semivoltine        170    37.28

INDICATOR ASSEMBLAGES
ASSEMBLAGE              ABUNDANCE    PERCENT
  A                            0         .00
  B                            0         .00
  C                            0         .00
  D                            0         .00
  E                            0         .00
  F                            0         .00
  G                            0         .00
  H                            0         .00
  I                            0         .00
  J                            0         .00

 End of report.
```

METRIC SUMMARY

Crooked River above Tillett Ranch, #1, July 10, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 306
Ephemeroptera+Plecoptera+Trichoptera (EPT) abundance = 294

TOTAL NUMBER OF TAXA = 17
Number EPT taxa = 13

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	2	6	1.96
Odonata	0	0	.00
Ephemeroptera	7	256	83.66
Plecoptera	2	4	1.30
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	4	34	11.10
Lepidoptera	0	0	.00
Coleoptera	0	0	.00
Misc. Diptera	0	0	.00
Chironomidae	2	6	1.96

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 49.00
Hydropsychidae/Total Trichoptera = .18

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	2	20	6.53
Parasite	0	0	.00
Collector-gatherer	9	216	70.58
Collector-filterer	1	6	1.96
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	0	0	.00
Scraper	2	52	17.00
Shredder	2	4	1.30
Xylophage	0	0	.00
Omnivore	1	8	2.61
Unknown	0	0	.00

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 8.67
Scraper/(Scraper + C.-filterer) = .90
Shredder/Total organisms = .013

```
Crooked River above Tillett Ranch, #1, July 10, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Baetis tricaudatus            170     55.56
Cinygmula                      26      8.50
Epeorus longimanus             26      8.50
Serratella tibialis            18      5.88
Rhyacophila Brunnea Gr.        18      5.88
SUBTOTAL 5 DOMINANTS          258     84.32
Diphetor hageni                 8      2.61
Brachycentrus americanus        8      2.61
Ameletus                        6      1.96
Hydropsyche                     6      1.96
Oligochaeta                     4      1.31
TOTAL 10 DOMINANTS            290     94.77

SAPROBIC INDICES
Hilsenhoff Biotic Index             =   4.41
Biotic Condition Index
   Community Tolerance Quotient (a) =  54.71
   Community Tolerance Quotient (d) = 116.00

DIVERSITY MEASURES
Shannon H (loge) =  1.73
Shannon H (log2) =  2.50
Evenness         =   .61
Brillouin H      =  1.64
Simpson D        =   .33

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine      141     46.24
Univoltine        145     47.55
Semivoltine        19      6.21

INDICATOR ASSEMBLAGES
ASSEMBLAGE              ABUNDANCE    PERCENT
  A                            0         .00
  B                            0         .00
  C                            0         .00
  D                            0         .00
  E                            0         .00
  F                            0         .00
  G                            0         .00
  H                            0         .00
  I                            0         .00
  J                            0         .00

 End of report.
```

METRIC SUMMARY

Crooked River above Tillett Ranch, #2, July 10, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 352
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 311

TOTAL NUMBER OF TAXA = 26
Number EPT taxa = 16

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	2	6	1.71
Odonata	0	0	.00
Ephemeroptera	6	287	81.53
Plecoptera	4	5	1.41
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	6	19	5.40
Lepidoptera	0	0	.00
Coleoptera	2	2	.56
Misc. Diptera	2	8	2.27
Chironomidae	4	25	7.09

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 12.44
Hydropsychidae/Total Trichoptera = .16

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	7	15	4.25
Parasite	0	0	.00
Collector-gatherer	9	262	74.42
Collector-filterer	2	8	2.27
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	1	2	.57
Scraper	3	40	11.36
Shredder	1	2	.57
Xylophage	0	0	.00
Omnivore	3	23	6.53
Unknown	0	0	.00

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 5.00
Scraper/(Scraper + C.-filterer) = .83
Shredder/Total organisms = .006

```
Crooked River above Tillett Ranch, #2, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Baetis tricaudatus            176     50.00
Serratella tibialis            66     18.75
Epeorus longimanus             20      5.68
Cinygmula                      19      5.40
Eukiefferiella                 17      4.83
SUBTOTAL 5 DOMINANTS          298     84.66
Orthocladius                    6      1.70
Brachycentrus occidentalis      5      1.42
Rhyacophila Brunnea Gr.         5      1.42
Simulium                        5      1.42
Oligochaeta                     4      1.14
TOTAL 10 DOMINANTS            323     91.76

SAPROBIC INDICES
Hilsenhoff Biotic Index             =   4.59
Biotic Condition Index
   Community Tolerance Quotient (a) =  62.81
   Community Tolerance Quotient (d) = 143.00

DIVERSITY MEASURES
Shannon H (loge) =  1.85
Shannon H (log2) =  2.67
Evenness         =   .57
Brillouin H      =  1.75
Simpson D        =   .29

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine       157     44.67
Univoltine         180     51.21
Semivoltine         14      4.12

INDICATOR ASSEMBLAGES
ASSEMBLAGE              ABUNDANCE    PERCENT
  A                            0         .00
  B                            0         .00
  C                            0         .00
  D                            0         .00
  E                            0         .00
  F                            0         .00
  G                            0         .00
  H                            0         .00
  I                            0         .00
  J                            0         .00

 End of report.
```

METRIC SUMMARY

Elk Creek, July 10, 1990.

```
Montana, RBP Benthic Macroinvertebrate Sample.
File: 90ELKFC


TOTAL ABUNDANCE =   1450
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance =    568

TOTAL NUMBER OF TAXA =   41
Number EPT taxa =   21

TAXONOMIC GROUP COMPOSITION
GROUP            #TAXA ABUNDANCE PERCENT
Misc. Taxa         2        16      1.11
Odonata            0         0       .00
Ephemeroptera      9       236     16.29
Plecoptera         1        42      2.90
Hemiptera          0         0       .00
Megaloptera        0         0       .00
Trichoptera       11       290     20.01
Lepidoptera        0         0       .00
Coleoptera         3       406     28.00
Misc. Diptera      4       112      7.72
Chironomidae      11       348     24.02

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae                  =   1.63
Hydropsychidae/Total Trichoptera =     .25

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION
GROUP                #TAXA  ABUNDANCE PERCENT
Predator               5        118      8.14
Parasite               0          0       .00
Collector-gatherer    19        614     42.37
Collector-filterer     3        118      8.14
Macrophyte-herbivore   1          2       .14
Piercer-herbivore      0          0       .00
Scraper                6        400     27.59
Shredder               1          2       .14
Xylophage              0          0       .00
Omnivore               4        188     12.97
Unknown                2          8       .56

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer         =    3.39
Scraper/(Scraper + C.-filterer)    =     .77
Shredder/Total organisms           =    .001
```

Elk Creek, July 10, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA

TAXON	ABUNDANCE	PERCENT
Optioservus	332	22.90
Micropsectra	148	10.21
Ceratopogonidae	76	5.24
Hydropsyche	72	4.97
Brachycentrus americanus	70	4.83
SUBTOTAL 5 DOMINANTS	698	48.15
Zaitzevia	64	4.41
Ephemerella inermis	52	3.59
Tvetenia	48	3.31
Baetis tricaudatus	46	3.17
Amiocentrus aspilus	46	3.17
TOTAL 10 DOMINANTS	954	65.80

SAPROBIC INDICES
Hilsenhoff Biotic Index = 4.06
Biotic Condition Index
   Community Tolerance Quotient (a) = 70.10
   Community Tolerance Quotient (d) = 125.00

DIVERSITY MEASURES
Shannon H (loge) = 3.01
Shannon H (log2) = 4.34
Evenness = .81
Brillouin H = 2.95
Simpson D = .08

COMMUNITY VOLTINISM ANALYSIS

TYPE	ABUNDANCE	PERCENT
Multivoltine	340	23.48
Univoltine	545	37.62
Semivoltine	564	38.90

INDICATOR ASSEMBLAGES

ASSEMBLAGE	ABUNDANCE	PERCENT
A	0	.00
B	0	.00
C	0	.00
D	0	.00
E	0	.00
F	0	.00
G	0	.00
H	0	.00
I	0	.00
J	0	.00

End of report.

METRIC SUMMARY

S.F.Flathead R. above Bunker Cr., August 31, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 199
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 193

TOTAL NUMBER OF TAXA = 14
Number EPT taxa = 11

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	0	0	.00
Odonata	0	0	.00
Ephemeroptera	7	178	89.45
Plecoptera	3	7	3.53
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	1	8	4.02
Lepidoptera	0	0	.00
Coleoptera	1	2	1.01
Misc. Diptera	1	2	1.01
Chironomidae	1	2	1.01

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 96.50
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	4	15	7.55
Parasite	0	0	.00
Collector-gatherer	4	83	41.71
Collector-filterer	0	0	.00
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	0	0	.00
Scraper	5	99	49.76
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	1	2	1.01
Unknown	0	0	.00

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filter undefined - Coll.-Filt.=0
Scraper/(Scraper + C.-filterer) = 1.00
Shredder/Total organisms = .000

```
S.F.Flathead R. above Bunker Cr., August 31, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                      ABUNDANCE PERCENT
Epeorus albertae                69     34.67
Drunella doddsi                 61     30.65
Rhithrogena                     24     12.06
Baetis tricaudatus              17      8.54
Arctopsyche grandis              8      4.02
SUBTOTAL 5 DOMINANTS           179     89.94
Serratella tibialis              3      1.51
Claassenia sabulosa              3      1.51
Cinygmula                        2      1.01
Epeorus longimanus               2      1.01
Hesperoperla pacifica            2      1.01
TOTAL 10 DOMINANTS             191     95.99

SAPROBIC INDICES
Hilsenhoff Biotic Index                =   1.16
Biotic Condition Index
   Community Tolerance Quotient (a) =  35.57
   Community Tolerance Quotient (d) =  71.00

DIVERSITY MEASURES
Shannon H (loge) =  1.78
Shannon H (log2) =  2.56
Evenness         =   .67
Brillouin H      =  1.67
Simpson D        =   .23

COMMUNITY VOLTINISM ANALYSIS
TYPE           ABUNDANCE PERCENT
Multivoltine       14       7.16
Univoltine        167      84.30
Semivoltine        17       8.54

INDICATOR ASSEMBLAGES
ASSEMBLAGE                 ABUNDANCE     PERCENT
  A                               0          .00
  B                               0          .00
  C                               0          .00
  D                               0          .00
  E                               0          .00
  F                               0          .00
  G                               0          .00
  H                               0          .00
  I                               0          .00
  J                               0          .00

 End of report.
```

METRIC SUMMARY

Four Mile Creek, Sept 13, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
File: 90FOURFC

TOTAL ABUNDANCE = 555
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 497

TOTAL NUMBER OF TAXA = 45
Number EPT taxa = 30

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	4	23	4.14
Odonata	0	0	.00
Ephemeroptera	10	297	53.50
Plecoptera	8	80	14.41
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	12	120	21.61
Lepidoptera	0	0	.00
Coleoptera	1	4	.72
Misc. Diptera	4	7	1.26
Chironomidae	6	24	4.32

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 20.71
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	11	74	13.32
Parasite	1	1	.18
Collector-gatherer	10	85	15.30
Collector-filterer	2	3	.54
Macrophyte-herbivore	1	20	3.60
Piercer-herbivore	1	11	1.98
Scraper	9	286	51.53
Shredder	5	56	10.09
Xylophage	0	0	.00
Omnivore	4	18	3.24
Unknown	1	1	.18

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 95.33
Scraper/(Scraper + C.-filterer) = .99
Shredder/Total organisms = .101

Four Mile Creek, Sept 13, 1990 cont.

```
CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Rhithrogena                   181     32.61
Cinygmula                      46      8.29
Apatania                       30      5.41
Zapada Oregonensis Gr.         28      5.05
Drunella doddsi                25      4.50
SUBTOTAL 5 DOMINANTS          310     55.86
Zapada columbiana              22      3.96
Micrasema                      20      3.60
Parapsyche elsis               18      3.24
Turbellaria                    14      2.52
Doroneuria                     14      2.52
TOTAL 10 DOMINANTS            398     71.70

SAPROBIC INDICES
Hilsenhoff Biotic Index                =   1.39
Biotic Condition Index
   Community Tolerance Quotient (a) =  49.87
   Community Tolerance Quotient (d) =  79.00

DIVERSITY MEASURES
Shannon H (loge) =  2.83
Shannon H (log2) =  4.08
Evenness         =   .74
Brillouin H      =  2.70
Simpson D        =   .13

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine       46      8.33
Univoltine        459     82.84
Semivoltine        49      8.83

INDICATOR ASSEMBLAGES
ASSEMBLAGE                  ABUNDANCE    PERCENT
  A                              0           .00
  B                              0           .00
  C                              0           .00
  D                              0           .00
  E                              0           .00
  F                              0           .00
  G                              0           .00
  H                              0           .00
  I                              0           .00
  J                              0           .00

 End of report.
```

METRIC SUMMARY

West Gallatin River, Sept. 4, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 820
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 644

TOTAL NUMBER OF TAXA = 26
Number EPT taxa = 15

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	1	12	1.46
Odonata	0	0	.00
Ephemeroptera	6	172	20.97
Plecoptera	4	48	5.85
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	5	424	51.70
Lepidoptera	0	0	.00
Coleoptera	0	0	.00
Misc. Diptera	5	112	13.66
Chironomidae	5	52	6.35

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 12.38
Hydropsychidae/Total Trichoptera = .12

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	8	152	18.53
Parasite	0	0	.00
Collector-gatherer	8	220	26.83
Collector-filterer	3	66	8.05
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	0	0	.00
Scraper	3	276	33.65
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	3	102	12.44
Unknown	1	4	.49

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 4.18
Scraper/(Scraper + C.-filterer) = .81
Shredder/Total organisms = .000

```
West Gallatin River, Sept. 4, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                          ABUNDANCE PERCENT
Glossosoma                          268    32.68
Brachycentrus occidentalis           78     9.51
Drunella doddsi                      74     9.02
Baetis tricaudatus                   72     8.78
Hydropsyche                          50     6.10
SUBTOTAL 5 DOMINANTS                542    66.09
Atherix                              50     6.10
Hexatoma                             40     4.88
Orthocladius                         34     4.15
Hesperoperla pacifica                26     3.17
Arctopsyche grandis                  26     3.17
TOTAL 10 DOMINANTS                  718    87.56

SAPROBIC INDICES
Hilsenhoff Biotic Index                    =   2.31
Biotic Condition Index
   Community Tolerance Quotient (a) =  57.31
   Community Tolerance Quotient (d) =  96.00

DIVERSITY MEASURES
Shannon H (loge) =  2.43
Shannon H (log2) =  3.50
Evenness         =   .75
Brillouin H      =  2.37
Simpson D        =   .15

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine       112    13.66
Univoltine         556    67.80
Semivoltine        152    18.54

INDICATOR ASSEMBLAGES
ASSEMBLAGE                ABUNDANCE     PERCENT
  A                             0           .00
  B                             0           .00
  C                             0           .00
  D                             0           .00
  E                             0           .00
  F                             0           .00
  G                             0           .00
  H                             0           .00
  I                             0           .00
  J                             0           .00

 End of report.
```

METRIC SUMMARY

Hanging Woman Creek near Birney, July 19, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 17104
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 4016

TOTAL NUMBER OF TAXA = 33
Number EPT taxa = 3

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	7	9680	56.59
Odonata	2	1152	6.73
Ephemeroptera	2	3936	23.01
Plecoptera	0	0	.00
Hemiptera	4	160	.94
Megaloptera	0	0	.00
Trichoptera	1	80	.47
Lepidoptera	0	0	.00
Coleoptera	4	128	.74
Misc. Diptera	4	752	4.40
Chironomidae	9	1216	7.10

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 3.30
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	10	2032	11.87
Parasite	0	0	.00
Collector-gatherer	15	13936	81.48
Collector-filterer	2	608	3.55
Macrophyte-herbivore	1	80	.47
Piercer-herbivore	2	176	1.03
Scraper	1	192	1.12
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	0	0	.00
Unknown	2	80	.46

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = .32
Scraper/(Scraper + C.-filterer) = .24
Shredder/Total organisms = .000

```
Hanging Woman Creek near Birney, July 19, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Physella                     8032     46.96
Caenis                       3104     18.15
Coenagrionidae               1104      6.45
Callibaetis                   832      4.86
Oligochaeta                   672      3.93
SUBTOTAL 5 DOMINANTS        13744     80.35
Ceratopogonidae               544      3.18
Pseudochironomus              480      2.81
Cladocera                     416      2.43
Ostracoda                     224      1.31
Gyraulus                      192      1.12
TOTAL 10 DOMINANTS          15600     91.20

SAPROBIC INDICES
Hilsenhoff Biotic Index             =   7.59
Biotic Condition Index
   Community Tolerance Quotient (a) =  97.52
   Community Tolerance Quotient (d) = 131.00

DIVERSITY MEASURES
Shannon H (loge) =  1.99
Shannon H (log2) =  2.86
Evenness         =   .57
Brillouin H      =  1.98
Simpson D        =   .26

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine     2364     13.82
Univoltine      14196     83.00
Semivoltine       544      3.18

INDICATOR ASSEMBLAGES
ASSEMBLAGE              ABUNDANCE    PERCENT
  A                            0         .00
  B                            0         .00
  C                            0         .00
  D                            0         .00
  E                            0         .00
  F                            0         .00
  G                            0         .00
  H                            0         .00
  I                            0         .00
  J                            0         .00

 End of report.
```

METRIC SUMMARY

Larb Creek, near mouth, near Saco, July 17, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 1316
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 148

TOTAL NUMBER OF TAXA = 28
Number EPT taxa = 5

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	8	772	58.66
Odonata	2	104	7.90
Ephemeroptera	2	128	9.73
Plecoptera	0	0	.00
Hemiptera	3	220	16.72
Megaloptera	0	0	.00
Trichoptera	3	20	1.52
Lepidoptera	0	0	.00
Coleoptera	3	16	1.21
Misc. Diptera	1	8	.61
Chironomidae	6	48	3.64

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 3.08
Hydropsychidae/Total Trichoptera = .20

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	9	160	12.15
Parasite	1	28	2.13
Collector-gatherer	9	476	36.17
Collector-filterer	2	32	2.43
Macrophyte-herbivore	1	4	.30
Piercer-herbivore	0	0	.00
Scraper	2	380	28.87
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	2	12	.91
Unknown	2	224	17.03

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 11.88
Scraper/(Scraper + C.-filterer) = .92
Shredder/Total organisms = .000

```
Larb Creek, near mouth, near Saco, July 17, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Gyraulus                      376     28.57
Corixidae                     208     15.81
Physella                      196     14.89
Coenagrionidae                 96      7.29
Oligochaeta                    72      5.47
SUBTOTAL 5 DOMINANTS          948     72.03
Callibaetis                    72      5.47
Caenidae                       56      4.26
Hyallela azteca                48      3.65
Cladocera                      28      2.13
Acari                          28      2.13
TOTAL 10 DOMINANTS           1180     89.67

SAPROBIC INDICES
Hilsenhoff Biotic Index             =   7.69
Biotic Condition Index
   Community Tolerance Quotient (a) =  97.85
   Community Tolerance Quotient (d) = 204.00

DIVERSITY MEASURES
Shannon H (loge) =  2.38
Shannon H (log2) =  3.43
Evenness         =   .71
Brillouin H      =  2.33
Simpson D        =   .14

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine      165      12.54
Univoltine       1087      82.60
Semivoltine        64       4.86

INDICATOR ASSEMBLAGES
ASSEMBLAGE              ABUNDANCE    PERCENT
  A                            0         .00
  B                            0         .00
  C                            0         .00
  D                            0         .00
  E                            0         .00
  F                            0         .00
  G                            0         .00
  H                            0         .00
  I                            0         .00
  J                            0         .00

 End of report.
```

METRIC SUMMARY

Odell Creek, RBP1, July 8, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 1668
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 556

TOTAL NUMBER OF TAXA = 34
Number EPT taxa = 16

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	3	216	12.95
Odonata	0	0	.00
Ephemeroptera	4	108	6.48
Plecoptera	5	30	1.80
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	7	418	25.05
Lepidoptera	0	0	.00
Coleoptera	2	746	44.72
Misc. Diptera	3	18	1.08
Chironomidae	10	132	7.92

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 4.21
Hydropsychidae/Total Trichoptera = .04

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	5	32	1.92
Parasite	0	0	.00
Collector-gatherer	14	376	22.55
Collector-filterer	4	46	2.76
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	0	0	.00
Scraper	4	1020	61.14
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	5	186	11.15
Unknown	2	8	.48

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 22.17
Scraper/(Scraper + C.-filterer) = .96
Shredder/Total organisms = .000

```
Odell Creek, RBP1, July 8, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Optioservus                   742     44.48
Stagnicola                    148      8.87
Glossosoma                    136      8.15
Helicopsyche borealis         134      8.03
Brachycentrus occidentalis    118      7.07
SUBTOTAL 5 DOMINANTS         1278     76.60
Oligochaeta                    60      3.60
Polypedilum                    54      3.24
Tricorythodes minutus          42      2.52
Attenella margarita            34      2.04
Baetis tricaudatus             30      1.80
TOTAL 10 DOMINANTS           1498     89.80

SAPROBIC INDICES
Hilsenhoff Biotic Index             =    3.81
Biotic Condition Index
   Community Tolerance Quotient (a) =   72.82
   Community Tolerance Quotient (d) =  130.00

DIVERSITY MEASURES
Shannon H (loge) =  2.17
Shannon H (log2) =  3.13
Evenness         =   .62
Brillouin H      =  2.13
Simpson D        =   .23

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine      127      7.64
Univoltine        615     36.90
Semivoltine       925     55.46

INDICATOR ASSEMBLAGES
ASSEMBLAGE              ABUNDANCE    PERCENT
  A                             0        .00
  B                             0        .00
  C                             0        .00
  D                             0        .00
  E                             0        .00
  F                             0        .00
  G                             0        .00
  H                             0        .00
  I                             0        .00
  J                             0        .00

 End of report.
```

METRIC SUMMARY

Odell Creek, RBP2, July 8, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 780
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 200

TOTAL NUMBER OF TAXA = 34
Number EPT taxa = 16

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	4	58	7.43
Odonata	0	0	.00
Ephemeroptera	4	92	11.79
Plecoptera	3	16	2.05
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	9	92	11.82
Lepidoptera	0	0	.00
Coleoptera	1	342	43.85
Misc. Diptera	3	22	2.81
Chironomidae	10	158	20.26

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 1.27
Hydropsychidae/Total Trichoptera = .11

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	6	28	3.60
Parasite	1	4	.51
Collector-gatherer	13	224	28.71
Collector-filterer	5	50	6.40
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	0	0	.00
Scraper	4	380	48.73
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	4	78	10.01
Unknown	1	16	2.05

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 7.60
Scraper/(Scraper + C.-filterer) = .88
Shredder/Total organisms = .000

```
Odell Creek, RBP2, July 8, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                           ABUNDANCE PERCENT
Optioservus                           342   43.85
Physella                               48    6.15
Orthocladius                           38    4.87
Brachycentrus occidentalis             36    4.62
Baetis tricaudatus                     32    4.10
SUBTOTAL 5 DOMINANTS                  496   63.59
Attenella margarita                    26    3.33
Cricotopus                             26    3.33
Polypedilum                            24    3.08
Tricorythodes minutus                  22    2.82
Rheotanytarsus                         20    2.56
TOTAL 10 DOMINANTS                    614   78.71

SAPROBIC INDICES
Hilsenhoff Biotic Index                    =   4.40
Biotic Condition Index
   Community Tolerance Quotient (a) =  73.18
   Community Tolerance Quotient (d) = 144.00

DIVERSITY MEASURES
Shannon H (loge) =  2.42
Shannon H (log2) =  3.50
Evenness         =   .69
Brillouin H      =  2.34
Simpson D        =   .21

COMMUNITY VOLTINISM ANALYSIS
TYPE            ABUNDANCE PERCENT
Multivoltine        160     20.51
Univoltine          228     29.23
Semivoltine         392     50.26

INDICATOR ASSEMBLAGES
ASSEMBLAGE                  ABUNDANCE     PERCENT
  A                                 0         .00
  B                                 0         .00
  C                                 0         .00
  D                                 0         .00
  E                                 0         .00
  F                                 0         .00
  G                                 0         .00
  H                                 0         .00
  I                                 0         .00
  J                                 0         .00

 End of report.
```

METRIC SUMMARY

O'Fallon Creek at Hwy. 12. July 18, 1990

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 656
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 84

TOTAL NUMBER OF TAXA = 17
Number EPT taxa = 2

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	2	12	1.83
Odonata	1	52	7.93
Ephemeroptera	2	84	12.81
Plecoptera	0	0	.00
Hemiptera	1	328	50.00
Megaloptera	0	0	.00
Trichoptera	0	0	.00
Lepidoptera	0	0	.00
Coleoptera	0	0	.00
Misc. Diptera	1	28	4.27
Chironomidae	10	152	23.18

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = .55
Hyd./Total Tri. undefined - Total Tri. = 0

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	6	112	17.08
Parasite	0	0	.00
Collector-gatherer	8	200	30.50
Collector-filterer	1	4	.61
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	0	0	.00
Scraper	0	0	.00
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	0	0	.00
Unknown	2	340	51.83

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = .00
Scraper/(Scraper + C.-filterer) = .00
Shredder/Total organisms = .000

```
O'Fallon Creek at Hwy. 12. July 18, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                      ABUNDANCE PERCENT
Corixidae                       328    50.00
Coenagrionidae                   52     7.93
Caenis                           44     6.71
Pseudochironomus                 44     6.71
Callibaetis                      40     6.10
SUBTOTAL 5 DOMINANTS            508    77.45
Procladius                       32     4.88
Ceratopogonidae                  28     4.27
Cladotanytarsus                  24     3.66
Tanypus                          20     3.05
Cryptotendipes                   12     1.83
TOTAL 10 DOMINANTS              624    95.14

SAPROBIC INDICES
Hilsenhoff Biotic Index              =   7.82
Biotic Condition Index
   Community Tolerance Quotient (a) = 103.76
   Community Tolerance Quotient (d) = 188.00

DIVERSITY MEASURES
Shannon H (loge) =  1.90
Shannon H (log2) =  2.75
Evenness         =   .67
Brillouin H      =  1.85
Simpson D        =   .28

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine        148    22.56
Univoltine          508    77.44
Semivoltine           0      .00

INDICATOR ASSEMBLAGES
ASSEMBLAGE                 ABUNDANCE     PERCENT
  A                                0         .00
  B                                0         .00
  C                                0         .00
  D                                0         .00
  E                                0         .00
  F                                0         .00
  G                                0         .00
  H                                0         .00
  I                                0         .00
  J                                0         .00

 End of report.
```

METRIC SUMMARY

Pine Creek, July 26, 1990.

```
Montana, RBP Benthic Macroinvertebrate Sample.
File: 90PINEFC


TOTAL ABUNDANCE =     324
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance =     234

TOTAL NUMBER OF TAXA =   34
Number EPT taxa =   17

TAXONOMIC GROUP COMPOSITION
GROUP               #TAXA ABUNDANCE PERCENT
Misc. Taxa              2        27    8.33
Odonata                 0         0     .00
Ephemeroptera           6        40   12.36
Plecoptera              5       109   33.64
Hemiptera               0         0     .00
Megaloptera             0         0     .00
Trichoptera             6        85   26.24
Lepidoptera             0         0     .00
Coleoptera              1         4    1.23
Misc. Diptera           5         6    1.86
Chironomidae            9        53   16.37

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae                   =    4.42
Hydropsychidae/Total Trichoptera =       .00

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION
GROUP                   #TAXA  ABUNDANCE PERCENT
Predator                    9         17    5.25
Parasite                    0          0     .00
Collector-gatherer          9         84   25.93
Collector-filterer          2          8    2.47
Macrophyte-herbivore        1         17    5.25
Piercer-herbivore           0          0     .00
Scraper                     4         79   24.39
Shredder                    5        105   32.41
Xylophage                   0          0     .00
Omnivore                    2         11    3.40
Unknown                     2          3     .93

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer          =    9.88
Scraper/(Scraper + C.-filterer)     =     .91
Shredder/Total organisms            =    .324
```

```
Pine Creek, July 26, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Yoraperla                      89     27.47
Neothremma alicia              61     18.83
Turbellaria                    26      8.02
Micropsectra                   20      6.17
Serratella tibialis            18      5.56
SUBTOTAL 5 DOMINANTS          214     66.05
Micrasema                      17      5.25
Cinygma                        10      3.09
Eukiefferiella                 10      3.09
Zapada columbiana               8      2.47
Tvetenia                        8      2.47
TOTAL 10 DOMINANTS            267     82.42

SAPROBIC INDICES
Hilsenhoff Biotic Index             =   2.18
Biotic Condition Index
   Community Tolerance Quotient (a) =  62.09
   Community Tolerance Quotient (d) = 131.00

DIVERSITY MEASURES
Shannon H (loge) =  2.59
Shannon H (log2) =  3.73
Evenness         =   .73
Brillouin H      =  2.43
Simpson D        =   .13

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine       66     20.60
Univoltine        249     77.08
Semivoltine         7      2.31

INDICATOR ASSEMBLAGES
ASSEMBLAGE              ABUNDANCE    PERCENT
  A                            0         .00
  B                            0         .00
  C                            0         .00
  D                            0         .00
  E                            0         .00
  F                            0         .00
  G                            0         .00
  H                            0         .00
  I                            0         .00
  J                            0         .00

 End of report.
```

METRIC SUMMARY

W.F. Poplar River at Hwy. 13. RBP 04-1A, August 22, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 4912
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 560

TOTAL NUMBER OF TAXA = 26
Number EPT taxa = 6

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	6	192	3.90
Odonata	1	176	3.58
Ephemeroptera	3	152	3.09
Plecoptera	0	0	.00
Hemiptera	2	16	.32
Megaloptera	0	0	.00
Trichoptera	3	408	8.30
Lepidoptera	0	0	.00
Coleoptera	1	8	.16
Misc. Diptera	2	3656	74.43
Chironomidae	8	304	6.19

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 1.84
Hydropsychidae/Total Trichoptera = .96

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	7	272	5.53
Parasite	0	0	.00
Collector-gatherer	8	360	7.32
Collector-filterer	4	4208	85.67
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	1	8	.16
Scraper	3	24	.48
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	2	32	.65
Unknown	1	8	.16

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = .00
Scraper/(Scraper + C.-filterer) = .00
Shredder/Total organisms = .000

```
W.F. Poplar River at Hwy. 13. RBP 04-1A, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                          ABUNDANCE PERCENT
Simulium                            3648   74.27
Cheumatopsyche                       392    7.98
Coenagrionidae                       176    3.58
Rheotanytarsus                       160    3.26
Callibaetis                          112    2.28
SUBTOTAL 5 DOMINANTS                4488   91.37
Hyallela azteca                       88    1.79
Physella                              56    1.14
Conchapelopia/Thienemannim            48     .98
Baetis                                32     .65
Psectrocladius                        32     .65
TOTAL 10 DOMINANTS                  4744   96.58

SAPROBIC INDICES
Hilsenhoff Biotic Index                 =   6.17
Biotic Condition Index
   Community Tolerance Quotient (a) = 100.15
   Community Tolerance Quotient (d) = 195.00

DIVERSITY MEASURES
Shannon H (loge) =  1.18
Shannon H (log2) =  1.70
Evenness         =   .36
Brillouin H      =  1.17
Simpson D        =   .56

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine       472     9.61
Univoltine        4424    90.07
Semivoltine         16      .33

INDICATOR ASSEMBLAGES
ASSEMBLAGE                  ABUNDANCE    PERCENT
  A                                 0        .00
  B                                 0        .00
  C                                 0        .00
  D                                 0        .00
  E                                 0        .00
  F                                 0        .00
  G                                 0        .00
  H                                 0        .00
  I                                 0        .00
  J                                 0        .00

 End of report.
```

METRIC SUMMARY

W.F. Poplar R. at Hwy. 13, RBP 04-1B, Aug 22, 1990.

```
Montana, RBP Benthic Macroinvertebrate Sample.
File: 90POPBFC

TOTAL ABUNDANCE =   1018
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance =    254

TOTAL NUMBER OF TAXA =   39
Number EPT taxa =   11

TAXONOMIC GROUP COMPOSITION
GROUP              #TAXA  ABUNDANCE  PERCENT
Misc. Taxa            9       162     15.93
Odonata               1        14      1.38
Ephemeroptera         7       176     17.30
Plecoptera            0         0       .00
Hemiptera             2        20      1.97
Megaloptera           0         0       .00
Trichoptera           4        78      7.66
Lepidoptera           0         0       .00
Coleoptera            2         4       .40
Misc. Diptera         2       384     37.72
Chironomidae         12       180     17.66

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae                   =   1.41
Hydropsychidae/Total Trichoptera =      .64

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION
GROUP                   #TAXA  ABUNDANCE  PERCENT
Predator                   9        68       6.68
Parasite                   0         0        .00
Collector-gatherer        13       308      30.26
Collector-filterer         6       564      55.40
Macrophyte-herbivore       1         2        .20
Piercer-herbivore          1        16       1.57
Scraper                    4        14       1.39
Shredder                   0         0        .00
Xylophage                  0         0        .00
Omnivore                   2         6        .59
Unknown                    3        40       3.93

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer          =     .02
Scraper/(Scraper + C.-filterer)     =     .02
Shredder/Total organisms            =    .000
```

```
W.F. Pop lar R. at Hwy. 13, RBP 04-1B, Aug 22, 1990 cont.


CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                       ABUNDANCE PERCENT
Simuliidae                      378     37.13
Hyallela azteca                 114     11.20
Baetis                           84      8.25
Rheotanytarsus                   76      7.47
Isonychia                        50      4.91
SUBTOTAL 5 DOMINANTS            702     68.96
Cheumatopsyche                   50      4.91
Chironomidae-pupae               20      1.96
Micropsectra                     20      1.96
Physella                         18      1.77
Callibaetis                      16      1.57
TOTAL 10 DOMINANTS              826     81.13

SAPROBIC INDICES
Hilsenhoff Biotic Index                =   6.01
Biotic Condition Index
   Community Tolerance Quotient (a) =  93.63
   Community Tolerance Quotient (d) = 186.00

DIVERSITY MEASURES
Shannon H (loge) =  2.51
Shannon H (log2) =  3.62
Evenness         =   .68
Brillouin H      =  2.43
Simpson D        =   .17

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine      240     23.62
Univoltine        768     75.49
Semivoltine         9       .88

INDICATOR ASSEMBLAGES
ASSEMBLAGE                 ABUNDANCE    PERCENT
  A                             0          .00
  B                             0          .00
  C                             0          .00
  D                             0          .00
  E                             0          .00
  F                             0          .00
  G                             0          .00
  H                             0          .00
  I                             0          .00
  J                             0          .00

 End of report.
```

METRIC SUMMARY

W.F. Poplar River at Hwy. 13, Veg. sample. August 22, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 1320
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 332

TOTAL NUMBER OF TAXA = 23
Number EPT taxa = 6

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	7	516	39.10
Odonata	1	48	3.64
Ephemeroptera	2	296	22.42
Plecoptera	0	0	.00
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	4	36	2.72
Lepidoptera	0	0	.00
Coleoptera	0	0	.00
Misc. Diptera	2	188	14.24
Chironomidae	7	236	17.87

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 1.41
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	4	320	24.25
Parasite	0	0	.00
Collector-gatherer	10	656	49.68
Collector-filterer	4	272	20.61
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	2	28	2.12
Scraper	1	36	2.73
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	2	8	.60
Unknown	0	0	.00

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = .13
Scraper/(Scraper + C.-filterer) = .12
Shredder/Total organisms = .000

W.F. Poplar River at Hwy. 13, Veg. sample. 1990 cont.

```
CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                          ABUNDANCE PERCENT
Baetis                               292    22.12
Hydra                                260    19.70
Simulium                             164    12.42
Hyallela azteca                      144    10.91
Rheotanytarsus                        76     5.76
SUBTOTAL 5 DOMINANTS                 936    70.91
Physella                              60     4.55
Nanocladius                           56     4.24
Coenagrionidae                        48     3.64
Micropsectra                          44     3.33
Gyraulus                              36     2.73
TOTAL 10 DOMINANTS                  1180    89.40

SAPROBIC INDICES
Hilsenhoff Biotic Index                 =   5.95
Biotic Condition Index
   Community Tolerance Quotient (a) = 100.96
   Community Tolerance Quotient (d) = 169.00

DIVERSITY MEASURES
Shannon H (loge) =  2.41
Shannon H (log2) =  3.47
Evenness         =   .77
Brillouin H      =  2.37
Simpson D        =   .13

COMMUNITY VOLTINISM ANALYSIS
TYPE           ABUNDANCE PERCENT
Multivoltine        565    42.80
Univoltine          755    57.20
Semivoltine           0      .00

INDICATOR ASSEMBLAGES
ASSEMBLAGE                ABUNDANCE     PERCENT
  A                               0         .00
  B                               0         .00
  C                               0         .00
  D                               0         .00
  E                               0         .00
  F                               0         .00
  G                               0         .00
  H                               0         .00
  I                               0         .00
  J                               0         .00

 End of report.
```

METRIC SUMMARY

Redwater Riverat Hwy. 201, RBP 06-1, August 23, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 260
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 20

TOTAL NUMBER OF TAXA = 11
Number EPT taxa = 1

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	1	20	7.69
Odonata	1	80	30.77
Ephemeroptera	1	20	7.69
Plecoptera	0	0	.00
Hemiptera	1	12	4.62
Megaloptera	0	0	.00
Trichoptera	0	0	.00
Lepidoptera	0	0	.00
Coleoptera	1	4	1.54
Misc. Diptera	0	0	.00
Chironomidae	6	124	47.71

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = .16
Hyd./Total Tri. undefined - Total Tri. = 0

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	2	84	32.31
Parasite	0	0	.00
Collector-gatherer	6	132	50.78
Collector-filterer	0	0	.00
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	0	0	.00
Scraper	0	0	.00
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	1	20	7.69
Unknown	2	24	9.24

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filter undefined - Coll.-Filt.=0
Scraper/(Scraper + C.-filterer) undefined
Shredder/Total organisms = .000

```
Redwater Riverat Hwy. 201, RBP 06-1, August 23, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                          ABUNDANCE PERCENT
Coenagrionidae                      80     30.77
Micropsectra                        56     21.54
Dicrotendipes                       36     13.85
Pacifasticus                        20      7.69
Caenis                              20      7.69
SUBTOTAL 5 DOMINANTS               212     81.54
Corixidae                           12      4.62
Endochironomus                      12      4.62
Paratanytarsus                      12      4.62
Dubiraphia                           4      1.54
Conchapelopia/Thienemannim           4      1.54
TOTAL 10 DOMINANTS                 256     98.48

SAPROBIC INDICES
Hilsenhoff Biotic Index                 =   7.83
Biotic Condition Index
   Community Tolerance Quotient (a) = 104.36
   Community Tolerance Quotient (d) = 166.00

DIVERSITY MEASURES
Shannon H (loge) =  1.98
Shannon H (log2) =  2.86
Evenness         =   .83
Brillouin H      =  1.90
Simpson D        =   .18

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine        93    35.77
Univoltine         143    55.00
Semivoltine         24     9.23

INDICATOR ASSEMBLAGES
ASSEMBLAGE                 ABUNDANCE     PERCENT
  A                                0         .00
  B                                0         .00
  C                                0         .00
  D                                0         .00
  E                                0         .00
  F                                0         .00
  G                                0         .00
  H                                0         .00
  I                                0         .00
  J                                0         .00

 End of report.
```

METRIC SUMMARY

Redwater River at Hwy. 201, Veg. Sample, August 23, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 760
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 20

TOTAL NUMBER OF TAXA = 22
Number EPT taxa = 3

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	4	280	36.84
Odonata	1	60	7.89
Ephemeroptera	2	16	2.10
Plecoptera	0	0	.00
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	1	4	.53
Lepidoptera	0	0	.00
Coleoptera	2	8	1.06
Misc. Diptera	2	8	1.06
Chironomidae	10	384	50.54

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = .05
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	5	76	10.01
Parasite	0	0	.00
Collector-gatherer	11	588	77.37
Collector-filterer	3	44	5.79
Macrophyte-herbivore	1	4	.53
Piercer-herbivore	0	0	.00
Scraper	0	0	.00
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	1	44	5.79
Unknown	1	4	.53

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = .00
Scraper/(Scraper + C.-filterer) = .00
Shredder/Total organisms = .000

```
Redwater River at Hwy. 201, Veg. Sample, August 23, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                      ABUNDANCE PERCENT
Dicrotendipes                    196   25.79
Hyallela azteca                  116   15.26
Physella                          88   11.58
Oligochaeta                       72    9.47
Coenagrionidae                    60    7.89
SUBTOTAL 5 DOMINANTS             532   69.99
Orthocladius                      48    6.32
Polypedilum                       44    5.79
Cricotopus                        32    4.21
Tanytarsus                        32    4.21
Pseudochironomus                  12    1.58
TOTAL 10 DOMINANTS               700   92.10

SAPROBIC INDICES
Hilsenhoff Biotic Index                =   7.27
Biotic Condition Index
   Community Tolerance Quotient (a) =  99.00
   Community Tolerance Quotient (d) = 217.00

DIVERSITY MEASURES
Shannon H (loge) =  2.37
Shannon H (log2) =  3.43
Evenness         =   .77
Brillouin H      =  2.31
Simpson D        =   .13

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine        300   39.47
Univoltine          416   54.74
Semivoltine          44    5.79

INDICATOR ASSEMBLAGES
ASSEMBLAGE                 ABUNDANCE    PERCENT
  A                                0        .00
  B                                0        .00
  C                                0        .00
  D                                0        .00
  E                                0        .00
  F                                0        .00
  G                                0        .00
  H                                0        .00
  I                                0        .00
  J                                0        .00

 End of report.
```

METRIC SUMMARY

Roaring Lion Creek, July 27, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 912
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 652

TOTAL NUMBER OF TAXA = 37
Number EPT taxa = 22

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	1	4	.44
Odonata	0	0	.00
Ephemeroptera	7	500	54.83
Plecoptera	5	60	6.59
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	10	92	10.11
Lepidoptera	0	0	.00
Coleoptera	0	0	.00
Misc. Diptera	2	16	1.76
Chironomidae	12	240	26.33

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 2.72
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	10	60	6.60
Parasite	0	0	.00
Collector-gatherer	9	228	25.02
Collector-filterer	4	80	8.78
Macrophyte-herbivore	1	4	.44
Piercer-herbivore	0	0	.00
Scraper	5	416	45.62
Shredder	5	72	7.90
Xylophage	0	0	.00
Omnivore	3	52	5.70
Unknown	0	0	.00

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 5.20
Scraper/(Scraper + C.-filterer) = .84
Shredder/Total organisms = .079

```
Roaring Lion Creek, July 27, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                          ABUNDANCE PERCENT
Epeorus grandis                     216    23.68
Epeorus longimanus                  164    17.98
Micropsectra                         64     7.02
Baetis tricaudatus                   52     5.70
Serratella tibialis                  40     4.39
SUBTOTAL 5 DOMINANTS                536    58.77
Zapada columbiana                    40     4.39
Dolophilodes                         36     3.95
Orthocladius                         36     3.95
Eukiefferiella                       32     3.51
Brillia                              20     2.19
TOTAL 10 DOMINANTS                  700    76.76

SAPROBIC INDICES
Hilsenhoff Biotic Index                  =   2.71
Biotic Condition Index
   Community Tolerance Quotient (a) =  54.22
   Community Tolerance Quotient (d) = 101.00

DIVERSITY MEASURES
Shannon H (loge) =  2.80
Shannon H (log2) =  4.04
Evenness         =   .78
Brillouin H      =  2.72
Simpson D        =   .11

COMMUNITY VOLTINISM ANALYSIS
TYPE            ABUNDANCE PERCENT
Multivoltine        223     24.45
Univoltine          661     72.48
Semivoltine          28      3.07

INDICATOR ASSEMBLAGES
ASSEMBLAGE                ABUNDANCE    PERCENT
  A                               0        .00
  B                               0        .00
  C                               0        .00
  D                               0        .00
  E                               0        .00
  F                               0        .00
  G                               0        .00
  H                               0        .00
  I                               0        .00
  J                               0        .00

 End of report.
```

METRIC SUMMARY

Lake Fork Rock Creek, August 22, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 580
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 456

TOTAL NUMBER OF TAXA = 32
Number EPT taxa = 18

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	1	4	.69
Odonata	0	0	.00
Ephemeroptera	8	348	60.01
Plecoptera	6	84	14.49
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	4	24	4.14
Lepidoptera	0	0	.00
Coleoptera	0	0	.00
Misc. Diptera	2	16	2.76
Chironomidae	11	104	17.94

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 4.38
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	8	72	12.42
Parasite	0	0	.00
Collector-gatherer	13	228	39.32
Collector-filterer	1	4	.69
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	0	0	.00
Scraper	3	184	31.73
Shredder	3	48	8.28
Xylophage	0	0	.00
Omnivore	2	28	4.83
Unknown	2	16	2.76

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 46.00
Scraper/(Scraper + C.-filterer) = .98
Shredder/Total organisms = .083

```
Lake Fork Rock Creek, August 22, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                         ABUNDANCE PERCENT
Cinygmula                          168    28.97
Baetis tricaudatus                 112    19.31
Zapada Oregonensis Gr.              28     4.83
Drunella doddsi                     20     3.45
Ameletus                            20     3.45
SUBTOTAL 5 DOMINANTS               348    60.01
Hesperoperla pacifica               20     3.45
Rheocricotopus                      20     3.45
Tvetenia                            20     3.45
Zapada columbiana                   16     2.76
Doroneuria                          12     2.07
TOTAL 10 DOMINANTS                 436    75.19

SAPROBIC INDICES
Hilsenhoff Biotic Index                 =   3.95
Biotic Condition Index
   Community Tolerance Quotient (a) =  59.25
   Community Tolerance Quotient (d) = 110.00

DIVERSITY MEASURES
Shannon H (loge) =  2.67
Shannon H (log2) =  3.85
Evenness         =   .77
Brillouin H      =  2.56
Simpson D        =   .13

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine       162    27.93
Univoltine         370    63.79
Semivoltine         48     8.28

INDICATOR ASSEMBLAGES
ASSEMBLAGE                      ABUNDANCE     PERCENT
  A                                 0           .00
  B                                 0           .00
  C                                 0           .00
  D                                 0           .00
  E                                 0           .00
  F                                 0           .00
  G                                 0           .00
  H                                 0           .00
  I                                 0           .00
  J                                 0           .00

 End of report.
```

METRIC SUMMARY

Rock Cr. NE of Hinsdale, RBP 03-1, August 22, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 2355
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 184

TOTAL NUMBER OF TAXA = 37
Number EPT taxa = 4

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	6	464	19.70
Odonata	1	136	5.77
Ephemeroptera	2	168	7.13
Plecoptera	0	0	.00
Hemiptera	2	104	4.42
Megaloptera	0	0	.00
Trichoptera	2	16	.68
Lepidoptera	0	0	.00
Coleoptera	3	32	1.36
Misc. Diptera	4	192	8.16
Chironomidae	17	1243	52.77

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = .15
Hydropsychidae/Total Trichoptera = .50

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	11	374	15.88
Parasite	0	0	.00
Collector-gatherer	15	1170	49.66
Collector-filterer	4	252	10.71
Macrophyte-herbivore	1	8	.34
Piercer-herbivore	0	0	.00
Scraper	0	0	.00
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	3	54	2.29
Unknown	3	497	21.11

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = .00
Scraper/(Scraper + C.-filterer) = .00
Shredder/Total organisms = .000

```
Rock Cr. NE of Hingdale, RBP 03-1, August 22, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                          ABUNDANCE PERCENT
Paratanytarsus                     313     13.29
Dicrotendipes                      250     10.62
Oligochaeta                        248     10.53
Hyallela azteca                    168      7.13
Endochironomus                     163      6.92
SUBTOTAL 5 DOMINANTS              1142     48.49
Caenis                             160      6.79
Coenagrionidae                     136      5.77
Simulium                           120      5.10
Tanytarsus                         100      4.25
Corixidae                           96      4.08
TOTAL 10 DOMINANTS                1754     74.48

SAPROBIC INDICES
Hilsenhoff Biotic Index                   =   7.00
Biotic Condition Index
   Community Tolerance Quotient (a) = 101.68
   Community Tolerance Quotient (d) = 156.00

DIVERSITY MEASURES
Shannon H (loge) =  2.98
Shannon H (log2) =  4.30
Evenness         =   .83
Brillouin H      =  2.94
Simpson D        =   .07

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine      976     41.45
Univoltine       1214     51.58
Semivoltine       164      6.96

INDICATOR ASSEMBLAGES
ASSEMBLAGE                 ABUNDANCE     PERCENT
  A                             0           .00
  B                             0           .00
  C                             0           .00
  D                             0           .00
  E                             0           .00
  F                             0           .00
  G                             0           .00
  H                             0           .00
  I                             0           .00
  J                             0           .00

 End of report.
```

METRIC SUMMARY

Rock Cr. NE of Hinsdale, Veg. Sample, August 22, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 440
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 10

TOTAL NUMBER OF TAXA = 22
Number EPT taxa = 2

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	5	140	31.81
Odonata	1	46	10.45
Ephemeroptera	1	8	1.82
Plecoptera	0	0	.00
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	1	2	.45
Lepidoptera	0	0	.00
Coleoptera	1	4	.91
Misc. Diptera	0	0	.00
Chironomidae	13	240	54.53

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = .04
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	3	56	12.72
Parasite	0	0	.00
Collector-gatherer	13	278	63.17
Collector-filterer	2	18	4.09
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	0	0	.00
Scraper	1	2	.45
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	2	4	.90
Unknown	1	82	18.64

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = .11
Scraper/(Scraper + C.-filterer) = .10
Shredder/Total organisms = .000

Rock Cr. NE of Hin~~g~~sdale, Veg. Sample, August 22, 1990 cont.

```
CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                         ABUNDANCE PERCENT
Hyallela azteca                    86     19.55
Paratanytarsus                     82     18.64
Dicrotendipes                      72     16.36
Coenagrionidae                     46     10.45
Oligochaeta                        44     10.00
SUBTOTAL 5 DOMINANTS              330     75.00
Cricotopus                         20      4.55
Endochironomus                     16      3.64
Ablabesmyia                        14      3.18
Tanytarsus                         12      2.73
Diphetor hageni                     8      1.82
TOTAL 10 DOMINANTS                400     90.92

SAPROBIC INDICES
Hilsenhoff Biotic Index                 =   7.27
Biotic Condition Index
   Community Tolerance Quotient (a) = 103.73
   Community Tolerance Quotient (d) = 236.00

DIVERSITY MEASURES
Shannon H (loge) =  2.37
Shannon H (log2) =  3.42
Evenness         =   .77
Brillouin H      =  2.28
Simpson D        =   .12

COMMUNITY VOLTINISM ANALYSIS
TYPE           ABUNDANCE PERCENT
Multivoltine       194     44.09
Univoltine         220     50.00
Semivoltine         26      5.91

INDICATOR ASSEMBLAGES
ASSEMBLAGE                  ABUNDANCE     PERCENT
  A                             0            .00
  B                             0            .00
  C                             0            .00
  D                             0            .00
  E                             0            .00
  F                             0            .00
  G                             0            .00
  H                             0            .00
  I                             0            .00
  J                             0            .00

 End of report.
```

METRIC SUMMARY

Seymour Creek, July 28, 1990

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 387
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 263

TOTAL NUMBER OF TAXA = 58
Number EPT taxa = 35

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	3	10	2.59
Odonata	0	0	.00
Ephemeroptera	14	163	42.13
Plecoptera	10	39	10.08
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	11	61	15.78
Lepidoptera	0	0	.00
Coleoptera	1	3	.78
Misc. Diptera	4	9	2.33
Chironomidae	15	102	26.37

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 2.58
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	19	72	18.63
Parasite	1	1	.26
Collector-gatherer	18	123	31.80
Collector-filterer	3	18	4.65
Macrophyte-herbivore	1	18	4.65
Piercer-herbivore	2	13	3.36
Scraper	5	86	22.23
Shredder	6	26	6.72
Xylophage	0	0	.00
Omnivore	3	30	7.76
Unknown	0	0	.00

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 4.78
Scraper/(Scraper + C.-filterer) = .83
Shredder/Total organisms = .067

```
Seymour Creek, July 28, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                          ABUNDANCE PERCENT
Epeorus albertae                     42     10.85
Eukiefferiella                       26      6.72
Parapsyche elsis                     25      6.46
Baetis tricaudatus                   24      6.20
Cinygmula                            21      5.43
SUBTOTAL 5 DOMINANTS                138     35.66
Epeorus longimanus                   19      4.91
Micrasema                            18      4.65
Serratella tibialis                  17      4.39
Zapada columbiana                    17      4.39
Tvetenia                             16      4.13
TOTAL 10 DOMINANTS                  225     58.13

SAPROBIC INDICES
Hilsenhoff Biotic Index                 =   2.97
Biotic Condition Index
   Community Tolerance Quotient (a) =  57.16
   Community Tolerance Quotient (d) = 125.00

DIVERSITY MEASURES
Shannon H (loge) =  3.47
Shannon H (log2) =  5.00
Evenness         =   .85
Brillouin H      =  3.24
Simpson D        =   .04

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine        98     25.39
Univoltine         244     63.11
Semivoltine         44     11.50

INDICATOR ASSEMBLAGES
ASSEMBLAGE                   ABUNDANCE     PERCENT
  A                                 0          .00
  B                                 0          .00
  C                                 0          .00
  D                                 0          .00
  E                                 0          .00
  F                                 0          .00
  G                                 0          .00
  H                                 0          .00
  I                                 0          .00
  J                                 0          .00

 End of report.
```

METRIC SUMMARY

W.F. Stillwater River, RBP1D, Aug 21, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
File: 90S2F1DC

TOTAL ABUNDANCE = 569
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 521

TOTAL NUMBER OF TAXA = 36
Number EPT taxa = 26

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	2	11	1.93
Odonata	0	0	.00
Ephemeroptera	10	478	84.02
Plecoptera	8	22	3.88
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	8	21	3.71
Lepidoptera	0	0	.00
Coleoptera	1	2	.35
Misc. Diptera	1	3	.53
Chironomidae	6	32	5.62

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 16.28
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	12	32	5.65
Parasite	0	0	.00
Collector-gatherer	12	135	23.73
Collector-filterer	1	1	.18
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	0	0	.00
Scraper	4	370	65.03
Shredder	4	14	2.46
Xylophage	0	0	.00
Omnivore	2	13	2.29
Unknown	1	4	.70

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 370.00
Scraper/(Scraper + C.-filterer) = 1.00
Shredder/Total organisms = .025

```
W.F. Stillwater River, RBP1D, Aug 21, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Epeorus albertae              197     34.62
Cinygmula                     104     18.28
Drunella doddsi                41      7.21
Rhithrogena                    41      7.21
Baetis tricaudatus             37      6.50
SUBTOTAL 5 DOMINANTS          420     73.82
Epeorus                        28      4.92
Drunella coloradensis          17      2.99
Rhyacophila Brunnea Gr.        13      2.28
Eukiefferiella                 12      2.11
Tvetenia                       10      1.76
TOTAL 10 DOMINANTS            500     87.88

SAPROBIC INDICES
Hilsenhoff Biotic Index             =    2.08
Biotic Condition Index
   Community Tolerance Quotient (a) =   45.17
   Community Tolerance Quotient (d) =   80.00

DIVERSITY MEASURES
Shannon H (loge) =  2.34
Shannon H (log2) =  3.38
Evenness         =   .65
Brillouin H      =  2.24
Simpson D        =   .17

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine       53      9.45
Univoltine        489     85.98
Semivoltine        26      4.57

INDICATOR ASSEMBLAGES
ASSEMBLAGE              ABUNDANCE    PERCENT
  A                            0         .00
  B                            0         .00
  C                            0         .00
  D                            0         .00
  E                            0         .00
  F                            0         .00
  G                            0         .00
  H                            0         .00
  I                            0         .00
  J                            0         .00

 End of report.
```

METRIC SUMMARY

W.F. Stillwater River, RBP2U, Aug.21, 1990.

Montana, RBP, Benthic Macroinvertebrate Sample.
File: 90STI2FC

TOTAL ABUNDANCE = 316
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 262

TOTAL NUMBER OF TAXA = 38
Number EPT taxa = 24

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	2	2	.64
Odonata	0	0	.00
Ephemeroptera	10	237	74.99
Plecoptera	6	15	4.75
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	8	10	3.19
Lepidoptera	0	0	.00
Coleoptera	1	2	.63
Misc. Diptera	4	12	3.80
Chironomidae	7	38	12.03

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 6.89
Hydropsychidae/Total Trichoptera = .10

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	9	22	6.97
Parasite	0	0	.00
Collector-gatherer	13	97	30.70
Collector-filterer	3	5	1.59
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	0	0	.00
Scraper	5	169	53.48
Shredder	3	8	2.53
Xylophage	0	0	.00
Omnivore	3	8	2.54
Unknown	2	7	2.22

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 33.80
Scraper/(Scraper + C.-filterer) = .97
Shredder/Total organisms = .025

```
W.F. Stillwater River, RBP2U, Aug.21, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                         ABUNDANCE PERCENT
Epeorus albertae                     77     24.37
Cinygmula                            75     23.73
Baetis tricaudatus                   31      9.81
Drunella doddsi                      15      4.75
Rhithrogena                          13      4.11
SUBTOTAL 5 DOMINANTS                211     66.77
Tvetenia                             12      3.80
Drunella coloradensis                10      3.16
Serratella tibialis                  10      3.16
Hexatoma                              8      2.53
Chironomidae-pupae                    6      1.90
TOTAL 10 DOMINANTS                  257     81.32

SAPROBIC INDICES
Hilsenhoff Biotic Index                  =   2.87
Biotic Condition Index
   Community Tolerance Quotient (a) =  55.53
   Community Tolerance Quotient (d) = 116.00

DIVERSITY MEASURES
Shannon H (loge) =  2.60
Shannon H (log2) =  3.75
Evenness         =   .71
Brillouin H      =  2.42
Simpson D        =   .13

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine        54    17.25
Univoltine         253    80.22
Semivoltine          8     2.53

INDICATOR ASSEMBLAGES
ASSEMBLAGE                  ABUNDANCE    PERCENT
  A                                 0        .00
  B                                 0        .00
  C                                 0        .00
  D                                 0        .00
  E                                 0        .00
  F                                 0        .00
  G                                 0        .00
  H                                 0        .00
  I                                 0        .00
  J                                 0        .00

 End of report.
```

METRIC SUMMARY

Stoney Creek, August 30, 1990

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 474
Ephemeroptera+Plecoptera+Trichoptera (EPT) abundance = 407

TOTAL NUMBER OF TAXA = 49
Number EPT taxa = 34

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	3	10	2.11
Odonata	0	0	.00
Ephemeroptera	11	229	48.31
Plecoptera	12	110	23.20
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	11	68	14.33
Lepidoptera	0	0	.00
Coleoptera	1	6	1.27
Misc. Diptera	2	2	.42
Chironomidae	9	49	10.33

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 8.31
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	13	63	13.28
Parasite	0	0	.00
Collector-gatherer	13	74	15.61
Collector-filterer	1	1	.21
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	1	27	5.70
Scraper	6	186	39.24
Shredder	8	92	19.40
Xylophage	0	0	.00
Omnivore	5	24	5.06
Unknown	2	7	1.47

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 186.00
Scraper/(Scraper + C.-filterer) = .99
Shredder/Total organisms = .194

```
Stoney Creek, August 30, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Epeorus albertae               53     11.18
Epeorus grandis                52     10.97
Yoraperla                      46      9.70
Rhithrogena                    42      8.86
Zapada columbiana              32      6.75
SUBTOTAL 5 DOMINANTS          225     47.46
Cinygmula                      31      6.54
Cricotopus Nostococladius      27      5.70
Ecclisomyia                    19      4.01
Drunella doddsi                18      3.80
Parapsyche elsis               14      2.95
TOTAL 10 DOMINANTS            334     70.46

SAPROBIC INDICES
Hilsenhoff Biotic Index             =   1.64
Biotic Condition Index
   Community Tolerance Quotient (a) =  54.37
   Community Tolerance Quotient (d) = 119.00

DIVERSITY MEASURES
Shannon H (loge) =  3.16
Shannon H (log2) =  4.56
Evenness         =   .81
Brillouin H      =  3.00
Simpson D        =   .06

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine       55     11.71
Univoltine        385     81.22
Semivoltine        33      7.07

INDICATOR ASSEMBLAGES
ASSEMBLAGE              ABUNDANCE    PERCENT
  A                             0        .00
  B                             0        .00
  C                             0        .00
  D                             0        .00
  E                             0        .00
  F                             0        .00
  G                             0        .00
  H                             0        .00
  I                             0        .00
  J                             0        .00

 End of report.
```

METRIC SUMMARY

S.F. Sun River, Sept 12, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, oregon, (503) 752-1568.

TOTAL ABUNDANCE = 916
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 762

TOTAL NUMBER OF TAXA = 43
Number EPT taxa = 27

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	1	2	.22
Odonata	0	0	.00
Ephemeroptera	9	538	58.72
Plecoptera	7	94	10.27
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	11	130	14.20
Lepidoptera	0	0	.00
Coleoptera	1	8	.87
Misc. Diptera	5	20	2.19
Chironomidae	9	124	13.54

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 6.15
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	15	148	16.16
Parasite	0	0	.00
Collector-gatherer	12	382	41.69
Collector-filterer	1	2	.22
Macrophyte-herbivore	1	6	.66
Piercer-herbivore	1	22	2.40
Scraper	6	240	26.20
Shredder	2	50	5.46
Xylophage	0	0	.00
Omnivore	3	48	5.25
Unknown	2	18	1.97

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 120.00
Scraper/(Scraper + C.-filterer) = .99
Shredder/Total organisms = .055

```
S.F. Sun River, Sept 12, 1990 cont.


CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                          ABUNDANCE PERCENT
Drunella doddsi                    212     23.14
Rhithrogena                        166     18.12
Epeorus longimanus                  44      4.80
Zapada Oregonensis Gr.              44      4.80
Baetis tricaudatus                  34      3.71
SUBTOTAL 5 DOMINANTS               500     54.57
Rhyacophila Brunnea Gr.             32      3.49
Drunella grandis                    30      3.28
Brachycentrus americanus            30      3.28
Orthocladius                        28      3.06
Epeorus albertae                    22      2.40
TOTAL 10 DOMINANTS                 642     70.08

SAPROBIC INDICES
Hilsenhoff Biotic Index                 =   1.49
Biotic Condition Index
   Community Tolerance Quotient (a) =  50.77
   Community Tolerance Quotient (d) =  81.00

DIVERSITY MEASURES
Shannon H (loge) =  2.92
Shannon H (log2) =  4.21
Evenness         =   .78
Brillouin H      =  2.83
Simpson D        =   .10

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine       120     13.16
Univoltine         704     76.91
Semivoltine         91      9.93

INDICATOR ASSEMBLAGES
ASSEMBLAGE                  ABUNDANCE     PERCENT
  A                                0          .00
  B                                0          .00
  C                                0          .00
  D                                0          .00
  E                                0          .00
  F                                0          .00
  G                                0          .00
  H                                0          .00
  I                                0          .00
  J                                0          .00

 End of report.
```

METRIC SUMMARY

Tenderfoot Creek, Sept. 6, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 1184
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 724

TOTAL NUMBER OF TAXA = 32
Number EPT taxa = 20

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	0	0	.00
Odonata	0	0	.00
Ephemeroptera	8	108	9.12
Plecoptera	3	24	2.03
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	9	592	50.00
Lepidoptera	0	0	.00
Coleoptera	2	128	10.81
Misc. Diptera	1	44	3.72
Chironomidae	9	288	24.35

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 2.51
Hydropsychidae/Total Trichoptera = .07

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	5	92	7.77
Parasite	0	0	.00
Collector-gatherer	13	348	29.41
Collector-filterer	1	40	3.38
Macrophyte-herbivore	1	4	.34
Piercer-herbivore	1	76	6.42
Scraper	5	264	22.30
Shredder	2	56	4.73
Xylophage	0	0	.00
Omnivore	2	296	25.00
Unknown	2	8	.68

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 6.60
Scraper/(Scraper + C.-filterer) = .87
Shredder/Total organisms = .047

```
Tenderfoot Creek, Sept. 6, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                          ABUNDANCE PERCENT
Brachycentrus americanus          272     22.97
Orthocladius                      152     12.84
Glossosoma                        108      9.12
Optioservus                       104      8.78
Cricotopus Nostococladius          76      6.42
SUBTOTAL 5 DOMINANTS              712     60.13
Lepidostoma-sand case larv         44      3.72
Apatania                           44      3.72
Antocha                            44      3.72
Hydropsyche                        40      3.38
Drunella grandis                   36      3.04
TOTAL 10 DOMINANTS                920     77.71

SAPROBIC INDICES
Hilsenhoff Biotic Index                  =   2.64
Biotic Condition Index
   Community Tolerance Quotient (a) =  56.25
   Community Tolerance Quotient (d) =  95.00

DIVERSITY MEASURES
Shannon H (loge) =  2.75
Shannon H (log2) =  3.97
Evenness         =   .79
Brillouin H      =  2.69
Simpson D        =   .10

COMMUNITY VOLTINISM ANALYSIS
TYPE            ABUNDANCE PERCENT
Multivoltine        250     21.11
Univoltine          466     39.36
Semivoltine         468     39.53

INDICATOR ASSEMBLAGES
ASSEMBLAGE                  ABUNDANCE     PERCENT
  A                                 0         .00
  B                                 0         .00
  C                                 0         .00
  D                                 0         .00
  E                                 0         .00
  F                                 0         .00
  G                                 0         .00
  H                                 0         .00
  I                                 0         .00
  J                                 0         .00

 End of report.
```

METRIC SUMMARY

N.F. Teton River, Sept. 11, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 522
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 518

TOTAL NUMBER OF TAXA = 25
Number EPT taxa = 21

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	0	0	.00
Odonata	0	0	.00
Ephemeroptera	9	401	76.82
Plecoptera	7	100	19.15
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	5	17	3.25
Lepidoptera	0	0	.00
Coleoptera	0	0	.00
Misc. Diptera	2	2	.38
Chironomidae	2	2	.38

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 259.00
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	6	36	6.89
Parasite	0	0	.00
Collector-gatherer	4	107	20.50
Collector-filterer	1	1	.19
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	0	0	.00
Scraper	7	296	56.70
Shredder	6	81	15.51
Xylophage	0	0	.00
Omnivore	1	1	.19
Unknown	0	0	.00

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 296.00
Scraper/(Scraper + C.-filterer) = 1.00
Shredder/Total organisms = .155

```
N.F. Teton River, Sept. 11, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                            ABUNDANCE PERCENT
Rhithrogena                          231     44.25
Zapada Oregonensis Gr.                49      9.39
Baetis tricaudatus                    45      8.62
Drunella doddsi                       44      8.43
Epeorus albertae                      30      5.75
SUBTOTAL 5 DOMINANTS                 399     76.44
Zapada columbiana                     28      5.36
Epeorus grandis                       16      3.07
Cinygmula                             15      2.87
Megarcys                              14      2.68
Drunella grandis                      12      2.30
TOTAL 10 DOMINANTS                   484     92.72

SAPROBIC INDICES
Hilsenhoff Biotic Index                    =   1.12
Biotic Condition Index
   Community Tolerance Quotient (a) =  30.92
   Community Tolerance Quotient (d) =  34.00

DIVERSITY MEASURES
Shannon H (loge) =  2.07
Shannon H (log2) =  2.99
Evenness         =   .64
Brillouin H      =  2.00
Simpson D        =   .23

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine        35     6.75
Univoltine         477    91.43
Semivoltine          9     1.82

INDICATOR ASSEMBLAGES
ASSEMBLAGE                 ABUNDANCE     PERCENT
  A                               0          .00
  B                               0          .00
  C                               0          .00
  D                               0          .00
  E                               0          .00
  F                               0          .00
  G                               0          .00
  H                               0          .00
  I                               0          .00
  J                               0          .00

 End of report.
```

METRIC SUMMARY

Tongue River near Pyramid Butte, July 19, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 2376
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 1052

TOTAL NUMBER OF TAXA = 27
Number EPT taxa = 12

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	5	224	9.44
Odonata	0	0	.00
Ephemeroptera	6	984	41.42
Plecoptera	0	0	.00
Hemiptera	1	120	5.05
Megaloptera	0	0	.00
Trichoptera	6	68	2.87
Lepidoptera	0	0	.00
Coleoptera	2	804	33.84
Misc. Diptera	3	100	4.21
Chironomidae	4	76	3.20

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 13.84
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	3	148	6.23
Parasite	0	0	.00
Collector-gatherer	12	2052	86.38
Collector-filterer	2	80	3.37
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	3	36	1.52
Scraper	5	40	1.69
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	2	20	.84
Unknown	0	0	.00

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = .50
Scraper/(Scraper + C.-filterer) = .33
Shredder/Total organisms = .000

```
Tongue River near Pyramid Butte, July 19, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Stenelmis                       792   33.33
Baetidae                        544   22.90
Leptophlebiidae                 364   15.32
Turbellaria                     124    5.22
Ambrysus                        120    5.05
SUBTOTAL 5 DOMINANTS           1944   81.82
Simulium                         72    3.03
Oligochaeta                      56    2.36
Tricorythodes minutus            52    2.19
Cricotopus                       52    2.19
Physella                         32    1.35
TOTAL 10 DOMINANTS             2208   92.94

SAPROBIC INDICES
Hilsenhoff Biotic Index             =   4.30
Biotic Condition Index
   Community Tolerance Quotient (a) =  91.37
   Community Tolerance Quotient (d) = 146.00

DIVERSITY MEASURES
Shannon H (loge) =  2.09
Shannon H (log2) =  3.01
Evenness         =   .63
Brillouin H      =  2.06
Simpson D        =   .19

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine      622     26.18
Univoltine        922     38.80
Semivoltine       832     35.02

INDICATOR ASSEMBLAGES
ASSEMBLAGE              ABUNDANCE    PERCENT
  A                             0        .00
  B                             0        .00
  C                             0        .00
  D                             0        .00
  E                             0        .00
  F                             0        .00
  G                             0        .00
  H                             0        .00
  I                             0        .00
  J                             0        .00

 End of report.
```

METRIC SUMMARY

Tule Creek at Hwy.13, RBP 05-1, August 23, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 1516
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 108

TOTAL NUMBER OF TAXA = 26
Number EPT taxa = 4

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	8	784	51.70
Odonata	1	184	12.14
Ephemeroptera	4	108	7.12
Plecoptera	0	0	.00
Hemiptera	2	68	4.49
Megaloptera	0	0	.00
Trichoptera	0	0	.00
Lepidoptera	0	0	.00
Coleoptera	2	100	6.60
Misc. Diptera	1	4	.26
Chironomidae	8	268	17.69

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = .40
Hyd./Total Tri. undefined - Total Tri. = 0

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	4	224	14.78
Parasite	0	0	.00
Collector-gatherer	17	1104	72.82
Collector-filterer	1	40	2.64
Macrophyte-herbivore	1	92	6.07
Piercer-herbivore	0	0	.00
Scraper	1	4	.26
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	0	0	.00
Unknown	2	52	3.43

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = .10
Scraper/(Scraper + C.-filterer) = .09
Shredder/Total organisms = .000

```
Tule Creek at Hwy.13, RBP 05-1, August 23, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                          ABUNDANCE  PERCENT
Hyallela azteca                    240     15.83
Physella                           220     14.51
Coenagrionidae                     184     12.14
Gammarus                           176     11.61
Dicrotendipes                      156     10.29
SUBTOTAL 5 DOMINANTS               976     64.38
Oligochaeta                         96      6.33
Haliplus                            92      6.07
Callibaetis                         80      5.28
Cladocera                           40      2.64
Corixidae                           40      2.64
TOTAL 10 DOMINANTS                1324     87.34

SAPROBIC INDICES
Hilsenhoff Biotic Index                 =   7.46
Biotic Condition Index
   Community Tolerance Quotient (a) =  97.62
   Community Tolerance Quotient (d) = 158.00

DIVERSITY MEASURES
Shannon H (loge) =  2.58
Shannon H (log2) =  3.72
Evenness         =   .79
Brillouin H      =  2.54
Simpson D        =   .10

COMMUNITY VOLTINISM ANALYSIS
TYPE           ABUNDANCE PERCENT
Multivoltine       307     20.25
Univoltine        1061     69.99
Semivoltine        148      9.76

INDICATOR ASSEMBLAGES
ASSEMBLAGE                  ABUNDANCE     PERCENT
  A                                0          .00
  B                                0          .00
  C                                0          .00
  D                                0          .00
  E                                0          .00
  F                                0          .00
  G                                0          .00
  H                                0          .00
  I                                0          .00
  J                                0          .00

 End of report.
```

METRIC SUMMARY

Tule Creek at Hwy. 13, Veg. Sample, August 23, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 1624
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 28

TOTAL NUMBER OF TAXA = 24
Number EPT taxa = 2

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	9	1112	68.48
Odonata	1	60	3.69
Ephemeroptera	2	28	1.73
Plecoptera	0	0	.00
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	0	0	.00
Lepidoptera	0	0	.00
Coleoptera	2	64	3.94
Misc. Diptera	1	48	2.96
Chironomidae	9	312	19.23

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = .09
Hyd./Total Tri. undefined - Total Tri. = 0

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	4	120	7.39
Parasite	1	4	.25
Collector-gatherer	15	1372	84.51
Collector-filterer	1	12	.74
Macrophyte-herbivore	1	56	3.45
Piercer-herbivore	0	0	.00
Scraper	1	32	1.97
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	0	0	.00
Unknown	1	28	1.72

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 2.67
Scraper/(Scraper + C.-filterer) = .73
Shredder/Total organisms = .000

```
Tule Creek at Hwy. 13, Veg. Sample, August 23, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                         ABUNDANCE PERCENT
Oligochaeta                        656    40.39
Hyallela azteca                    260    16.01
Pseudochironomus                    88     5.42
Psectrocladius                      80     4.93
Ostracoda                           76     4.68
SUBTOTAL 5 DOMINANTS              1160    71.43
Dicrotendipes                       68     4.19
Physella                            64     3.94
Coenagrionidae                      60     3.69
Haliplus                            56     3.45
Ceratopogonidae                     48     2.96
TOTAL 10 DOMINANTS                1456    89.66

SAPROBIC INDICES
Hilsenhoff Biotic Index                  =   6.41
Biotic Condition Index
   Community Tolerance Quotient (a) = 101.25
   Community Tolerance Quotient (d) = 185.00

DIVERSITY MEASURES
Shannon H (loge) =  2.19
Shannon H (log2) =  3.16
Evenness         =   .69
Brillouin H      =  2.15
Simpson D        =   .20

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine       350    21.55
Univoltine         882    54.31
Semivoltine        392    24.14

INDICATOR ASSEMBLAGES
ASSEMBLAGE                 ABUNDANCE     PERCENT
  A                                0         .00
  B                                0         .00
  C                                0         .00
  D                                0         .00
  E                                0         .00
  F                                0         .00
  G                                0         .00
  H                                0         .00
  I                                0         .00
  J                                0         .00

 End of report.
```

METRIC SUMMARY

Waldron Creek, Sept. 11, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 828
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 744

TOTAL NUMBER OF TAXA = 32
Number EPT taxa = 24

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	3	40	4.83
Odonata	0	0	.00
Ephemeroptera	7	334	40.32
Plecoptera	9	346	41.77
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	8	64	7.72
Lepidoptera	0	0	.00
Coleoptera	0	0	.00
Misc. Diptera	3	30	3.62
Chironomidae	2	14	1.69

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 53.14
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	13	146	17.62
Parasite	0	0	.00
Collector-gatherer	6	314	37.91
Collector-filterer	0	0	.00
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	0	0	.00
Scraper	5	70	8.44
Shredder	5	284	34.29
Xylophage	0	0	.00
Omnivore	3	14	1.69
Unknown	0	0	.00

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filter undefined - Coll.-Filt.=0
Scraper/(Scraper + C.-filterer) = 1.00
Shredder/Total organisms = .343

```
Waldron Creek, Sept. 11, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                          ABUNDANCE PERCENT
Yoraperla                            172   20.77
Drunella doddsi                      134   16.18
Baetis tricaudatus                   130   15.70
Zapada columbiana                     94   11.35
Megarcys                              54    6.52
SUBTOTAL 5 DOMINANTS                 584   70.52
Rhithrogena                           40    4.83
Turbellaria                           34    4.11
Oreogeton                             22    2.66
Rhyacophila Hyalinata Gr.             20    2.42
Epeorus grandis                       18    2.17
TOTAL 10 DOMINANTS                   718   86.71

SAPROBIC INDICES
Hilsenhoff Biotic Index                    =   2.16
Biotic Condition Index
   Community Tolerance Quotient (a) =  42.32
   Community Tolerance Quotient (d) =  77.00

DIVERSITY MEASURES
Shannon H (loge) =  2.53
Shannon H (log2) =  3.65
Evenness         =   .73
Brillouin H      =  2.46
Simpson D        =   .12

COMMUNITY VOLTINISM ANALYSIS
TYPE           ABUNDANCE PERCENT
Multivoltine       144    17.39
Univoltine         644    77.78
Semivoltine         40     4.83

INDICATOR ASSEMBLAGES
ASSEMBLAGE                  ABUNDANCE     PERCENT
  A                                 0         .00
  B                                 0         .00
  C                                 0         .00
  D                                 0         .00
  E                                 0         .00
  F                                 0         .00
  G                                 0         .00
  H                                 0         .00
  I                                 0         .00
  J                                 0         .00

 End of report.
```

METRIC SUMMARY

Willow Creek at Hwy. 2, RBP#1, August 20, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 12379
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 2496

TOTAL NUMBER OF TAXA = 35
Number EPT taxa = 5

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	7	7616	61.52
Odonata	2	120	.96
Ephemeroptera	2	2272	18.36
Plecoptera	0	0	.00
Hemiptera	1	128	1.03
Megaloptera	0	0	.00
Trichoptera	3	224	1.80
Lepidoptera	0	0	.00
Coleoptera	2	40	.32
Misc. Diptera	4	160	1.28
Chironomidae	14	1819	14.69

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 1.37
Hydropsychidae/Total Trichoptera = .25

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	9	436	3.51
Parasite	0	0	.00
Collector-gatherer	14	8571	69.24
Collector-filterer	4	1894	15.29
Macrophyte-herbivore	1	8	.06
Piercer-herbivore	1	160	1.29
Scraper	1	384	3.10
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	2	25	.20
Unknown	3	901	7.27

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = .20
Scraper/(Scraper + C.-filterer) = .17
Shredder/Total organisms = .000

```
Willow Creek at Hwy. 2, RBP#1, August 20, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Hyallela azteca              5192     41.94
Caenis                       2192     17.71
Cladocera                    1664     13.44
Paratanytarsus                765      6.18
Gyraulus                      384      3.10
SUBTOTAL 5 DOMINANTS        10197     82.37
Cricotopus                    323      2.61
Physella                      232      1.87
Ablabesmyia                   170      1.37
Hydroptila                    160      1.29
Dicrotendipes                 136      1.10
TOTAL 10 DOMINANTS          11218     90.61

SAPROBIC INDICES
Hilsenhoff Biotic Index             =    7.58
Biotic Condition Index
   Community Tolerance Quotient (a) =   99.77
   Community Tolerance Quotient (d) =  139.00

DIVERSITY MEASURES
Shannon H (loge) =  2.05
Shannon H (log2) =  2.95
Evenness         =   .58
Brillouin H      =  2.04
Simpson D        =   .23

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine     3350     27.06
Univoltine       8980     72.55
Semivoltine        48       .39

INDICATOR ASSEMBLAGES
ASSEMBLAGE              ABUNDANCE    PERCENT
  A                             0        .00
  B                             0        .00
  C                             0        .00
  D                             0        .00
  E                             0        .00
  F                             0        .00
  G                             0        .00
  H                             0        .00
  I                             0        .00
  J                             0        .00

 End of report.
```

METRIC SUMMARY

Willow Creek at Hwy. 2, Veg. Sample, August 20, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 5540
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 352

TOTAL NUMBER OF TAXA = 22
Number EPT taxa = 2

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	4	1956	35.31
Odonata	1	8	.14
Ephemeroptera	1	328	5.92
Plecoptera	0	0	.00
Hemiptera	1	4	.07
Megaloptera	0	0	.00
Trichoptera	1	24	.43
Lepidoptera	0	0	.00
Coleoptera	1	4	.07
Misc. Diptera	2	28	.51
Chironomidae	11	3188	57.54

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = .11
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	6	1145	20.66
Parasite	0	0	.00
Collector-gatherer	10	2957	53.38
Collector-filterer	2	622	11.23
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	1	24	.43
Scraper	1	40	.72
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	0	0	.00
Unknown	2	752	13.57

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = .06
Scraper/(Scraper + C.-filterer) = .06
Shredder/Total organisms = .000

```
Willow Creek at Hwy. 2, Veg. Sample, August 20, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Hyallela azteca              1392     25.13
Conchapelopia/Thienemannim   1040     18.77
Paratanytarsus                748     13.50
Tanytarsus                    390      7.04
Caenis                        328      5.92
SUBTOTAL 5 DOMINANTS         3898     70.36
Orthocladius                  293      5.29
Copepoda                      292      5.27
Cricotopus                    260      4.69
Cladocera                     232      4.19
Dicrotendipes                 163      2.94
TOTAL 10 DOMINANTS           5138     92.74

SAPROBIC INDICES
Hilsenhoff Biotic Index             =   6.95
Biotic Condition Index
   Community Tolerance Quotient (a) = 104.73
   Community Tolerance Quotient (d) = 142.00

DIVERSITY MEASURES
Shannon H (loge) =  2.32
Shannon H (log2) =  3.35
Evenness         =   .75
Brillouin H      =  2.31
Simpson D        =   .14

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine      2933    52.94
Univoltine        2603    46.99
Semivoltine          4      .07

INDICATOR ASSEMBLAGES
ASSEMBLAGE              ABUNDANCE    PERCENT
  A                             0        .00
  B                             0        .00
  C                             0        .00
  D                             0        .00
  E                             0        .00
  F                             0        .00
  G                             0        .00
  H                             0        .00
  I                             0        .00
  J                             0        .00

 End of report.
```

METRIC SUMMARY

Wisconson Creek, August 4, 1990.

Montana, RBP Benthic Macroinvertebrate Sample.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TOTAL ABUNDANCE = 846
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 694

TOTAL NUMBER OF TAXA = 36
Number EPT taxa = 18

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	5	46	5.44
Odonata	0	0	.00
Ephemeroptera	5	116	13.71
Plecoptera	7	174	20.58
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	6	404	47.76
Lepidoptera	0	0	.00
Coleoptera	2	4	.48
Misc. Diptera	5	26	3.08
Chironomidae	6	76	8.97

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 9.13
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	10	70	8.29
Parasite	1	6	.71
Collector-gatherer	10	172	20.33
Collector-filterer	1	4	.47
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	1	16	1.89
Scraper	4	398	47.05
Shredder	4	154	18.21
Xylophage	0	0	.00
Omnivore	4	22	2.60
Unknown	1	4	.47

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 99.50
Scraper/(Scraper + C.-filterer) = .99
Shredder/Total organisms = .182

```
Wisconson Creek, August 4, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Neothremma alicia             362     42.79
Zapada columbiana             138     16.31
Ameletus                       76      8.98
Micropsectra                   44      5.20
Turbellaria                    28      3.31
SUBTOTAL 5 DOMINANTS          648     76.59
Rhyacophila Iranda Gr.         24      2.84
Cinygma                        22      2.60
Cricotopus Nostococladius      16      1.89
Cinygmula                      12      1.42
Tipula                         12      1.42
TOTAL 10 DOMINANTS            734     86.76

SAPROBIC INDICES
Hilsenhoff Biotic Index             =   1.47
Biotic Condition Index
   Community Tolerance Quotient (a) =  63.28
   Community Tolerance Quotient (d) = 131.00

DIVERSITY MEASURES
Shannon H (loge) =  2.22
Shannon H (log2) =  3.20
Evenness         =   .62
Brillouin H      =  2.14
Simpson D        =   .22

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine       99     11.70
Univoltine        718     84.87
Semivoltine        29      3.43

INDICATOR ASSEMBLAGES
ASSEMBLAGE              ABUNDANCE    PERCENT
  A                            0         .00
  B                            0         .00
  C                            0         .00
  D                            0         .00
  E                            0         .00
  F                            0         .00
  G                            0         .00
  H                            0         .00
  I                            0         .00
  J                            0         .00

 End of report.
```

TAXA ABUNDANCE DATA-SITE LISTING

Rapid Bioassessment Protocol III

File:CVTAXABU

Tabular summaries of taxa identified from each site/sample, along with their relative abundance and percent contribution to the total community are provided here. In each site summary, taxa are usually listed at the lowest practical taxonomic level for RBP III analysis. With hindsight, this level has not always been consistent for certain taxa..e.g. *Sphaerium* vs. Sphaeriidae. In most of these instances, a simple name substitution, and not the partitioning of one higher level taxa into 2 or more taxonomic units, or vice versa, is involved. Thus, metric calculations are not affected.

Where identifications have been made to a finer level than required for RBP III analysis, the names have been listed at the bottom of the file.

Subtotals by major taxonomic group are supplied in these summaries, as are grand totals. Since there were no replicate samples from each site, the mean and standard deviation will not be listed. Relative abundance numbers are raw taxa counts for each sample, which have been adjusted back to a full sample if subsampling occurred. The 1992 version of the metric programs provides space for listing of the percentage of the sample sorted.

Each site is stored as an individual file (Lotus 123 and Quattro Pro). File names are listed on a following page. Some of the more recent printouts have the file name listed in the header at the top of the page. Taxa abundance data files are all _______A.WK1 (Lotus) or ______A.WQ1 (Quattro) files. The Quattro files have been formatted for printing. Use the print to fit function and a laser printer.

Taxa abundance information for each site is also stored in ASCII format under the _______B files.

Montana, Reference Stream Project 1990

Listing of samples collected, date, and file codes. RBP 3 analysis.
File: SITE.WQ1

	Date Collected	File Prefix	Taxa Abun. File(s)	ASCII File	Metric Summary File
Armstrong Spring Creek	July 11	:90MTAS1	A&B	C	D
Armstrong Spring Creek, Veg.	July 11	:90MTASV	A&B	C	D
Battle Creek north of Chinook, 02-1A	Aug. 21	:90MTBCA	A&B	C	D
Battle Creek north of Chinook, 02-1B	Aug. 21	:90MTBCB	A&B	C	D
Battle Creek north of Chinook, 02-3 Veg.	Aug. 21	:90MTBCV	A&B	C	D
Ben Hart Spring Creek, RBP 5	July 16	:90MTBH5	A&B	C	D
Ben Hart Spring Creek Veg.	July 28	:90BHVF	A	B	C
Big Creek	July 26	:90MTBIG	A&B	C	D
Big Hole River above Hwy ?34 or 43	July 23	:90MBH34	A&B	C	D
Big Hole River at Fishtrap	July 23	:90MBHRF	A&B	C	D
Big Spring Creek below State Hatchery	July 25	:90MBSSH	A&B	C	D
Big Spring Creek below State Hatchery, Veg.	July 25	:90MBSHV	A&B	C	D
Boulder Creek	Aug. 23	:90MBOUL	A&B	C	D
Box Elder Creek, riffle	July 18	:90MBECR	A&B	C	D
Box Elder Creek, pool	July 18	:90MBECP	A&B	C	D
East Fork Bull River	Sept. 2	:90MEFBR	A&B	C	D
Calf Creek	Sept. 6	:90CA2FF	A	B	C
Crooked R. above Tillett Ranch, RBP 1	July 10	:90MCRT1	A&B	C	D
Crooked R. above Tillett Ranch, RBP 2	July 10	:90MCRT2	A&B	C	D
Elk Creek	July 20	:90ELKF	A	B	C
S.F. Flathead R. above Bunker Creek	Aug. 31	:90MFLAT	A&B	C	D
Four Mile Creek	Sept. 13	:90FOURF	A	B	C
West Gallatin River	Sept. 4	:90MWGAR	A&B	C	D
Hanging Woman Creek near Birney	July 19	:90MHANG	A&B	C	D
Larb Creek near mouth near Saco	July 17	:90MLARB	A&B	C	D
Odell Creek, RBP 1	July 8	:90MODE1	A&B	C	D
Odell Creek, RBP 2	July 8	:90MODE2	A&B	C	D
O'Fallon Creek at hwy 12	July 18	:90MOFAL	A&B	C	D
Pine Creek	July 26	:90PINEF	A	B	C
W.F. Poplar R. at hwy 13, RBP 04-1A	Aug. 22	:90MPOPA	A&B	C	D
W.F. Poplar R. at hwy 13, RBP 04-1B	Aug. 22	:90POPBF	A	B	C
W.F. Poplar R. at hwy 13, Veg.	Aug. 22	:90MPOV	A&B	C	D
Redwater R. at hwy 201, RBP 06-1	Aug. 23	:90MRED1	A&B	C	D
Redwater R. at hwy 201, Veg.	Aug. 23	:90MREDV	A&B	C	D
Roaring Lion Creek	July 27	:90MLION	A&B	C	D
Lake Fork Rock Creek	Aug. 22	:90MLFRO	A&B	C	D
Rock Cr. NE Hinsdale, RBP 03-1	Aug. 22	:90MROC1	A&B	C	D
Rock Cr. NE Hinsdale, Veg.	Aug. 22	:90MROCV	A&B	C	D
Seymour Creek	July 28	:90MSEYM	A&B	C	D
W.F. Stillwater R., RBP1D	Aug. 21	:90S2F1D	A	B	C
W.F. Stillwater R., RBP2U	Aug. 21	:90STI2F	A	B	C
Stoney Creek	Aug. 30	:90MSTON	A&B	C	D
S.F. Sun River	Sept. 12	:90SUNF	A	B	C
Tenderfoot Creek	Sept. 6	:90MTEND	A&B	C	D
N.F. Teton River	Sept. 11	:90MTETO	A&B	C	D
Tongue R. near Pyramid Butte	July 19	:90MTONG	A&B	C	D
Tule Creek at hwy 13, RBP 05-1	Aug. 23	:90MTUL1	A&B	C	D
Tule Creek at hwy 13, Veg.	Aug. 23	:90MTULV	A&B	C	D
Waldron Creek	Sept. 11	:90MWALD	A&B	C	D
Willow Creek at hwy 2, RBP 1	Aug. 20	:90MWIL1	A&B	C	D
Willow Creek at hwy 2, Veg.	Aug. 20	:90MWILV	A&B	C	D
Wisconsin Creek	Aug. 4	:90MWISC	A&B	C	D

Armstrong Spring Creek, Sample 1, July 11, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
A150	Turbellaria	108	4.24
C010	Hirudinea	24	0.94
D150	*Sphaerium*	8	0.31
D580	*Stagnicola*	36	1.41
D670	*Physella*	326	12.80
E550	Gammarus	52	2.04
E710	*Caecidotea*	148	5.81
F000	Acari	4	0.16
	TOTAL: MISC. TAXA	706	27.73
H142	*Baetis tricaudatus*	492	19.32
H765	*Ephemerella inermis*	4	0.16
I600	*Paraleptophlebia*	4	0.16
	TOTAL: EPHEMEROPTERA	500	19.64
N130	*Amiocentrus aspilus*	12	0.47
N170	*Brachycentrus occidentalis*	24	0.94
N450	*Glossosoma*	8	0.31
O070	*Hydroptila*	276	10.84
	TOTAL: TRICOPTERA	320	12.57
S220	*Heterlimnius*	24	0.94
	TOTAL: COLEOPTERA	24	0.94
U400	*Brachycera*	4	0.16
W450	*Simulium*	16	0.63
	TOTAL: DIPTERA	20	0.79
Y460	*Cricotopus*	24	0.94
Y520	*Cricotopus Nostococladius*	12	0.47
Y750	*Eukiefferiella*	476	18.70
Z095	*Micropsectra*	12	0.47
Z230	*Pagastia*	440	17.28
Z630	*Tanytarsus*	12	0.47
	TOTAL: CHIRONOMIDAE	976	38.33
	GRAND TOTAL	2546	100.00

Physella lordi, Sphaerium simile, Stagnicola elrodi,
Gammarus lacustris, Caecidotea racovitzae racovitza
Ophidonais serpentina, Nais communis

Armstrong Spring Creek, Veg. Sample, July 11, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
B000	Oligochaeta	34	3.86
D500	Lymnaeidae	6	0.68
D670	*Physella*	132	15.00
E300	Ostracoda	6	0.68
E550	Gammarus	20	2.27
E710	*Caecidotea*	54	6.14
	TOTAL: MISC. TAXA	252	28.64
H142	*Baetis tricaudatus*	434	49.32
H705	*Drunella coloradensis*	2	0.23
H765	*Ephemerella inermis*	2	0.23
	TOTAL: EPHEMEROPTERA	438	49.77
N170	*Brachycentrus occidentalis*	12	1.36
O070	*Hydroptila*	26	2.95
O482	Lepidostoma-sand case larvae	2	0.23
	TOTAL: TRICOPTERA	40	4.55
W300	Simuliidae	2	0.23
W390	*Prosimulium*	2	0.23
W450	*Simulium*	30	3.41
	TOTAL: DIPTERA	34	3.86
Y150	*Brillia*	4	0.45
Y630	*Dicrotendipes*	2	0.23
Y750	*Eukiefferiella*	36	4.09
Z195	*Orthocladius*	44	5.00
Z230	*Pagastia*	14	1.59
Z610	*Synorthocladius*	2	0.23
Z630	*Tanytarsus*	14	1.59
	TOTAL: CHIRONOMIDAE	116	13.18
	GRAND TOTAL	880	100.00

Gammarus lacustris, Caecidotea racovitzai racovitzai
Physella lordi, Stagnicola elrodi
Nais variablis, Ophidonais serpentina, Nais communis

Battle Creek north of Chinook, 02-1A, August 21, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
A001	Porifera	8	0.26
A110	*Hydra*	4	0.13
A300	Nematoda	4	0.13
B000	Oligochaeta	248	8.06
D110	*Pisidium*	16	0.52
D420	*Ferrissia*	64	2.08
D510	*Fossaria*	4	0.13
D670	*Physella*	248	8.06
D690	Planorbidae	12	0.39
D700	*Gyraulus*	80	2.60
E100	Cladocera	28	0.91
E200	Copepoda	16	0.52
E300	Ostracoda	16	0.52
E660	*Hyallela azteca*	512	16.64
F000	Acari	80	2.60
	TOTAL: MISC. TAXA	1340	43.56
G600	Coenagrionidae	60	1.95
	TOTAL: ODONATA	60	1.95
H142	*Baetis tricaudatus*	32	1.04
H284	*Diphetor hageni*	4	0.13
H490	*Caenis*	252	8.19
I470	*Stenonema*	36	1.17
I600	*Paraleptophlebia*	16	0.52
	TOTAL: EPHEMEROPTERA	340	11.05
N690	*Cheumatopsyche*	236	7.67
N800	*Hydropsyche*	20	0.65
O000	Hydroptilidae	8	0.26
O070	*Hydroptila*	4	0.13
O630	*Oecetis*	4	0.13
P450	*Polycentropus*	8	0.26
	TOTAL: TRICOPTERA	280	9.10
R200	Dytiscidae	4	0.13
S170	*Dubiraphia*	8	0.26
S600	Haliplidae	4	0.13
	TOTAL: COLEOPTERA	16	0.52
U450	Ceratopogonidae	68	2.21
V100	*Anopheles*	4	0.13
V605	*Hemerodromia*	8	0.26
X610	*Dicranota*	8	0.26
	TOTAL: DIPTERA	88	2.86
Y400	*Conchapelopia/Thienemannimyia*	69	2.24
Y710	*Endochironomus*	10	0.33
Z095	*Micropsectra*	624	20.29
Z320	*Paratanytarsus*	100	3.25
Z440	*Psectrocladius*	10	0.33
Z480	*Pseudochironomus*	30	0.98
Z630	*Tanytarsus*	109	3.54
	TOTAL: CHIRONOMIDAE	952	30.95
	GRAND TOTAL	3076	100.00

Physella propinqua nuttalli, Ferrissia parallelus, Planorbella (P.) subcrenatum
Gyraulus parvus, Fossaria (B.) bulimoides cockerelli, Pisidium (C.) compressum
Chaetogaster diaphanus, Nais variablis, Imma. Tubificidae w/o cap. chetae

Battle Creek north of Chinook, 02-1B, August 21, 199

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
A300	Nematoda	4	0.36
D420	*Ferrissia*	56	5.02
D670	*Physella*	164	14.70
E100	Cladocera	8	0.72
E200	Copepoda	4	0.36
E300	Ostracoda	4	0.36
E660	*Hyallela azteca*	60	5.38
F000	Acari	28	2.51
	TOTAL: MISC. TAXA	328	29.39
G600	*Coenagrion/Enallagma*	84	7.53
	TOTAL: ODONATA	84	7.53
H142	*Baetis tricaudatus*	16	1.43
H490	*Caenis*	44	3.94
I470	*Stenonema*	24	2.15
I600	*Paraleptophlebia*	4	0.36
I790	*Isonychia*	4	0.36
	TOTAL: EPHEMEROPTERA	92	8.24
N690	*Cheumatopsyche*	368	32.97
O070	*Hydroptila*	8	0.72
O120	*Ithytrichia*	4	0.36
P450	*Polycentropus*	8	0.72
	TOTAL: TRICOPTERA	388	34.77
R200	Dytiscidae	4	0.36
S170	*Dubiraphia*	16	1.43
	TOTAL: COLEOPTERA	20	1.79
V605	*Hemerodromia*	8	0.72
	TOTAL: DIPTERA	8	0.72
Y400	*Conchapelopia/Thienemannimyia*	4	0.36
Z095	*Micropsectra*	128	11.47
Z250	*Parachironomus*	4	0.36
Z320	*Paratanytarsus*	24	2.15
Z540	*Rheotanytarsus*	4	0.36
Z630	*Tanytarsus*	32	2.87
	TOTAL: CHIRONOMIDAE	196	17.56
	GRAND TOTAL	1116	100.00

see taxa annotations on other sample

Battle Creek N. of Chinook, 02-3 Veg., August 21, 199

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
A001	Porifera	8	0.53
B000	Oligochaeta	128	8.47
D420	*Ferrissia*	76	5.03
D510	*Fossaria*	4	0.26
D670	*Physella*	348	23.02
D690	*Planorbella*	48	3.17
D700	*Gyraulus*	200	13.23
E100	Cladocera	12	0.79
E200	Copepoda	8	0.53
E300	Ostracoda	56	3.70
E660	*Hyallela azteca*	228	15.08
F000	Acari	12	0.79
	TOTAL: MISC. TAXA	1128	74.60
G600	Coenagrionidae	68	4.50
	TOTAL: ODONATA	68	4.50
H490	*Caenis*	36	2.38
	TOTAL: EPHEMEROPTERA	36	2.38
U450	Ceratopogonidae	12	0.79
	TOTAL: DIPTERA	12	0.79
Y710	*Endochironomus*	4	0.26
Z095	*Micropsectra*	156	10.32
Z320	*Paratanytarsus*	88	5.82
Z630	*Tanytarsus*	20	1.32
	TOTAL: CHIRONOMIDAE	268	17.72
	GRAND TOTAL	1512	100.00

see taxa annoations for other sample

Ben Hart Spring Creek, RBP5, July 16, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
B000	Oligochaeta	24	0.97
D150	*Sphaerium*	8	0.32
D510	*Fossaria*	4	0.16
D670	*Physella*	24	0.97
	TOTAL: MISC. TAXA	60	2.42
H142	*Baetis tricaudatus*	276	11.15
H284	*Diphetor hageni*	60	2.42
H640	*Attenella margarita*	4	0.16
H700	*Drunella*	4	0.16
H765	*Ephemerella inermis*	156	6.30
H870	*Serratella tibialis*	12	0.48
I250	*Heptagenia*	140	5.65
I990	*Tricorythodes minutus*	152	6.14
	TOTAL: EPHEMEROPTERA	804	32.47
N130	*Amiocentrus aspilus*	24	0.97
N160	*Brachycentrus americanus*	8	0.32
N170	*Brachycentrus occidentalis*	56	2.26
N320	*Agapetus*	724	29.24
N450	*Glossosoma*	240	9.69
N575	*Helicopsyche borealis*	8	0.32
O070	*Hydroptila*	36	1.45
P600	*Rhyacophila*	4	0.16
P746	*Rhyacophila Vemna Gr.*	8	0.32
	TOTAL: TRICOPTERA	1108	44.75
S220	*Heterlimnius*	100	4.04
	TOTAL: COLEOPTERA	100	4.04
W640	*Caloparyphus*	4	0.16
X610	*Dicranota*	40	1.62
	TOTAL: DIPTERA	44	1.78
Y750	*Eukiefferiella*	208	8.40
Y950	*Hydrobaenus*	4	0.16
Z195	*Orthocladius*	44	1.78
Z230	*Pagastia*	64	2.58
Z305	*Parametriocnemus*	32	1.29
Z630	*Tanytarsus*	4	0.16
Z725	*Tvetenia*	4	0.16
	TOTAL: CHIRONOMIDAE	360	14.54
	GRAND TOTAL	2476	100.00

Physella (juveniles), Sphaerium simile, Fossaria modicella
Agapetus montanus (male pupae)

Ben Hart Spring Creek, Veg. Sample, July 28, 1990

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
File: 90BHVF A,B,C

TAXACODE	Taxon	RA	%
A110	*Hydra*	1	0.65
A300	Nematoda	1	0.65
B000	Oligochaeta	4	2.60
D670	*Physella*	2	1.30
	TOTAL: MISC. TAXA	8	5.19
H142	*Baetis tricaudatus*	23	14.94
H284	*Diphetor hageni*	13	8.44
H765	*Ephemerella inermis*	21	13.64
I360	*Nixe*	1	0.65
I990	*Tricorythodes minutus*	8	5.19
	TOTAL: EPHEMEROPTERA	66	42.86
N170	*Brachycentrus occidentalis*	5	3.25
N320	*Agapetus*	2	1.30
P746	*Rhyacophila Vemna*	2	1.30
	TOTAL: TRICHOPTERA	9	5.84
S220	*Heterlimnius*	3	1.95
T000	Hydrophilidae	1	0.65
	TOTAL: COLEOPTERA	4	2.60
W300	Simuliidae	5	3.25
	TOTAL: DIPTERA	5	3.25
Y001	Chironomidae-pupae	2	1.30
Y750	*Eukiefferiella*	40	25.97
Z195	*Orthocladius*	6	3.90
Z230	*Pagastia*	6	3.90
Z685	*Thienemanniella*	8	5.19
	TOTAL: CHIRONOMIDAE	62	40.26
	GRAND TOTAL	154	100.00

Big Creek, July 26, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
A150	Turbellaria	2	0.70
	TOTAL: MISC. TAXA	2	0.70
H142	*Baetis tricaudatus*	81	28.42
H705	*Drunella coloradensis*	21	7.37
H710	*Drunella doddsi*	2	0.70
H870	*Serratella tibialis*	29	10.18
I150	*Cinygmula*	39	13.68
I205	*Epeorus albertae*	22	7.72
I215	*Epeorus longimanus*	11	3.86
I420	*Rhithrogena*	3	1.05
I900	*Ameletus*	16	5.61
	TOTAL: EPHEMEROPTERA	224	78.60
J977	*Zapada Oregonensis Gr.*	2	0.70
K130	*Doroneuria*	2	0.70
K520	*Kogotus*	1	0.35
	TOTAL: PLECOPTERA	5	1.75
N089	*Parapsyche elsis*	1	0.35
N450	*Glossosoma*	4	1.40
O798	*Dicosmoecus atripes*	1	0.35
P602	*Rhyacophila Alberta Gr.*	1	0.35
P622	*Rhyacophila Betteni Gr.*	2	0.70
P630	*Rhyacophial Brunnea Gr.*	1	0.35
P686	*Rhyacophila narvae*	1	0.35
P915	*Neothremma alicia*	1	0.35
	TOTAL: TRICOPTERA	12	4.21
S320	*Optioservus*	2	0.70
	TOTAL: COLEOPTERA	2	0.70
Y460	*Cricotopus*	2	0.70
Y520	*Cricotopus Nostococladius*	2	0.70
Y750	*Eukiefferiella*	15	5.26
Z195	*Orthocladius*	17	5.96
Z305	*Parametriocnemus*	1	0.35
Z600	*Sympotthastia*	1	0.35
Z725	*Tvetenia*	2	0.70
	TOTAL: CHIRONOMIDAE	40	14.04
	GRAND TOTAL	285	100.00

Optioservus quadrimaculatus

Big Hole River above Hwy 34, July 23, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
A001	Porifera	1060	57.99
D110	*Pisidium*	4	0.22
D670	*Physella*	2	0.11
	TOTAL: MISC. TAXA	1066	58.32
H142	*Baetis tricaudatus*	28	1.53
H026	*Acentrella insignificans*	4	0.22
H028	*Acentrella turbida*	4	0.22
H640	*Attenella margarita*	16	0.88
H870	*Serratella tibialis*	46	2.52
I205	*Epeorus albertae*	36	1.97
I360	*Nixe*	46	2.52
I600	*Paraleptophlebia*	4	0.22
I990	*Tricorythodes minutus*	14	0.77
	TOTAL: EPHEMEROPTERA	198	10.83
K113	*Calineuria californica*	4	0.22
K125	*Claassenia sabulosa*	8	0.44
K200	*Hesperoperla pacifica*	6	0.33
K835	*Pteronarcys californica*	12	0.66
	TOTAL: PLECOPTERA	30	1.64
N130	*Amiocentrus aspilus*	12	0.66
N160	*Brachycentrus americanus*	4	0.22
N170	*Brachycentrus occidentalis*	10	0.55
N450	*Glossosoma*	138	7.55
N575	*Helicopsyche borealis*	4	0.22
N690	*Cheumatopsyche*	2	0.11
N800	*Hydropsyche*	74	4.05
O482	*Lepidostoma-sand case larvae*	8	0.44
	TOTAL: TRICHOPTERA	252	13.79
S320	*Optioservus*	34	1.86
S450	*Zaitzevia parvula*	42	2.30
S610	*Brychius*	2	0.11
	TOTAL: COLEOPTERA	78	4.27
U450	Ceratopogonidae	4	0.22
W390	*Prosimulium*	6	0.33
X670	*Hexatoma*	14	0.77
	TOTAL: DIPTERA	24	1.31
Y450	*Corynoneura*	2	0.11
Y460	*Cricotopus*	30	1.64
Y750	*Eukiefferiella*	14	0.77
Z095	*Micropsectra*	8	0.44
Z375	*Polypedilum*	50	2.74
Z540	*Rheotanytarsus*	36	1.97
Z600	*Sympotthastia*	2	0.11
Z630	*Tanytarsus*	2	0.11
Z725	*Tvetenia*	36	1.97
	TOTAL: CHIRONOMIDAE	180	9.85
	GRAND TOTAL	1828	100.00

Physella lordi, Pisidium (C.) milium, Optioservus seriatus

Big Hole River at Fishtrap, July 23, 1990

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
B000	Oligochaeta	24	0.61
D700	*Gyraulus*	8	0.20
F000	Acari	56	1.42
	TOTAL: MISC. TAXA	88	2.24
H142	*Baetis tricaudatus*	112	2.85
H284	*Diphetor hageni*	24	0.61
H640	*Attenella margarita*	64	1.63
H765	*Ephemerella inermis*	8	0.20
H870	*Serratella tibialis*	32	0.81
I205	*Epeorus albertae*	24	0.61
I360	*Nixe*	208	5.28
I605	*Paraleptophlebia bicornuta*	8	0.20
I990	*Tricorythodes minutus*	136	3.46
	TOTAL: EPHEMEROPTERA	616	15.65
K125	*Claassenia sabulosa*	8	0.20
K200	*Hesperoperla pacifica*	8	0.20
K670	*Skwala*	8	0.20
K835	*Pteronarcys californica*	8	0.20
	TOTAL: PLECOPTERA	32	0.81
N170	*Brachycentrus occidentalis*	16	0.41
N690	*Cheumatopsyche*	48	1.22
N800	*Hydropsyche*	1192	30.28
O070	*Hydroptila*	72	1.83
O420	*Lepidostoma*	8	0.20
O530	*Ceraclea*	32	0.81
O630	*Oecetis*	8	0.20
P220	*Wormaldia*	8	0.20
	TOTAL: TRICOPTERA	1384	35.16
S320	*Optioservus*	128	3.25
S450	*Zaitzevia parvula*	64	1.63
	TOTAL: COLEOPTERA	192	4.88
U450	Ceratopogonidae	72	1.83
W390	*Prosimulium*	16	0.41
W450	*Simulium*	24	0.61
	TOTAL: DIPTERA	112	2.85
Y400	*Conchapelopia/Thienemannimyia*	48	1.22
Y460	*Cricotopus*	8	0.20
Y520	*Cricotopus Nostococladius*	128	3.25
Y750	*Eukiefferiella*	232	5.89
Z195	*Orthocladius*	184	4.67
Z360	*Pentaneura*	8	0.20
Z375	*Polypedilum*	40	1.02
Z540	*Rheotanytarsus*	24	0.61
Z600	*Sympotthastia*	8	0.20
Z685	*Thienemanniella*	40	1.02
Z725	*Tvetenia*	792	20.12
	TOTAL: CHIRONOMIDAE	1512	38.41
	GRAND TOTAL	3936	100.00

Gyraulus parvus, *Optioservus seriatus*

Big Spring Creek below State Hatchery, July 25, 1990

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
A150	Turbellaria	32	0.59
B000	Oligochaeta	8	0.15
D150	*Sphaerium*	8	0.15
D510	*Fossaria*	24	0.44
D670	*Physella*	32	0.59
	TOTAL: MISC. TAXA	104	1.91
H142	*Baetis tricaudatus*	96	1.76
H028	*Acentrella turbida*	32	0.59
H284	*Diphetor hageni*	8	0.15
H765	*Ephemerella inermis*	376	6.89
	TOTAL: EPHEMEROPTERA	512	9.38
J780	*Malenka*	24	0.44
	TOTAL: PLECOPTERA	24	0.44
N160	*Brachycentrus americanus*	1528	28.01
N210	*Micrasema*	288	5.28
N450	*Glossosoma*	72	1.32
O482	Lepidostoma-sand case larvae	2760	50.59
P630	*Rhyacophila Brunnea Gr.*	24	0.44
P870	*Neophylax*	8	0.15
	TOTAL: TRICOPTERA	4680	85.78
S320	*Optioservus*	16	0.29
	TOTAL: COLEOPTERA	16	0.29
W390	*Prosimulium*	8	0.15
W450	*Simulium*	16	0.29
X560	*Antocha*	24	0.44
X870	*Tipula*	8	0.15
	TOTAL: DIPTERA	56	1.03
Y340	*Cladotanytarsus*	40	0.73
Z195	*Orthocladius*	8	0.15
Z230	*Pagastia*	8	0.15
Z685	*Thienemanniella*	8	0.15
	TOTAL: CHIRONOMIDAE	64	1.17
	GRAND TOTAL	5456	100.00

Physella propinqua, Fossaria (B.) bulimoides cockerelli, Sphaerium simile
Neophylax rickeri

Big Spring Creek below State Hatchery, Veg. Sample.

July 25, 1990

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
A150	Turbellaria	6	0.88
D150	*Sphaerium*	2	0.29
D510	*Fossaria*	8	1.17
D670	*Physella*	62	9.06
	TOTAL: MISC. TAXA	78	11.40
H142	*Baetis tricaudatus*	18	2.63
H765	*Ephemerella inermis*	52	7.60
	TOTAL: EPHEMEROPTERA	70	10.23
N160	*Brachycentrus americanus*	78	11.40
N210	*Micrasema*	70	10.23
O482	Lepidostoma-sand case larvae	354	51.75
	TOTAL: TRICOPTERA	502	73.39
V530	*Chelifera*	2	0.29
W300	Simuliidae	2	0.29
W390	*Prosimulium*	20	2.92
	TOTAL: DIPTERA	24	3.51
Y750	*Eukiefferiella*	10	1.46
	TOTAL: CHIRONOMIDAE	10	1.46
	GRAND TOTAL	684	100.00

Sphaerium simile, Fossaria (B.) bulimoides cockerelli, Physella propinqua

Boulder Creek, August 23, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

RA	Taxon	RA	%
2	Turbellaria	2	0.34
2	TOTAL: MISC. TAXA	2	0.34
2	*Acentrella turbida*	2	0.34
100	*Baetis tricaudatus*	100	17.18
2	*Caudatella hystrix*	2	0.34
24	*Drunella coloradensis*	24	4.12
22	*Drunella doddsi*	22	3.78
14	*Serratella tibialis*	14	2.41
54	*Cinygmula*	54	9.28
152	*Epeorus albertae*	152	26.12
34	*Epeorus longimanus*	34	5.84
8	*Epeorus grandis*	8	1.37
74	*Rhithrogena*	74	12.71
2	*Ameletus*	2	0.34
488	TOTAL: EPHEMEROPTERA	488	83.85
4	*Sweltsa*	4	0.69
2	*Zapada cinctipes*	2	0.34
4	*Zapada columbiana*	4	0.69
12	*Zapada Oregonensis Gr.*	12	2.06
4	*Doroneuria*	4	0.69
2	*Kogotus*	2	0.34
24	*Megarcys*	24	4.12
52	TOTAL: PLECOPTERA	52	8.93
4	*Parapsyche elsis*	4	0.69
4	*Apatania*	4	0.69
6	*Rhyacophial Brunnea Gr.*	6	1.03
8	*Rhyacophila Hyalinata Gr.*	8	1.37
22	TOTAL: TRICHOPTERA	22	3.78
2	*Heterlimnius*	2	0.34
2	TOTAL: COLEOPTERA	2	0.34
2	*Simulium*	2	0.34
2	TOTAL: DIPTERA	2	0.34
2	*Eukiefferiella*	2	0.34
6	*Orthocladius*	6	1.03
2	*Stempellinella*	2	0.34
4	*Tvetenia*	4	0.69
14	TOTAL: CHIRONOMIDAE	14	2.41
582	GRAND TOTAL	582	100.00

Heterlimnius corpulentus

Box Elder Creek, Riffle, July 18, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
A110	*Hydra*	2	0.64
D420	*Ferrissia*	2	0.64
D670	*Physella*	3	0.96
	TOTAL: MISC. TAXA	7	2.23
G600	Coenagrionidae	12	3.82
	TOTAL: ODONATA	12	3.82
H180	*Callibaetis*	9	2.87
H490	*Caenis*	24	7.64
I470	*Stenonema*	79	25.16
I550	*Leptophlebia*	6	1.91
I790	*Isonychia*	2	0.64
I990	*Tricorythodes minutus*	2	0.64
	TOTAL: EPHEMEROPTERA	122	38.85
L100	Corixidae	22	7.01
	TOTAL: HEMIPTERA	22	7.01
M550	*Sialis*	3	0.96
	TOTAL: MEGALOPTERA	3	0.96
N690	*Cheumatopsyche*	27	8.60
N800	*Hydropsyche*	12	3.82
O630	*Oecetis*	1	0.32
P450	*Polycentropus*	10	3.18
	TOTAL: TRICOPTERA	50	15.92
Q600	*Petrophila*	1	0.32
	TOTAL: LEPIDOPTERA	1	0.32
S170	*Dubiraphia*	1	0.32
	TOTAL: COLEOPTERA	1	0.32
Y400	*Conchapelopia/Thienemannimyia*	10	3.18
Y460	*Cricotopus*	4	1.27
Y580	*Cryptochironomus*	2	0.64
Y630	*Dicrotendipes*	34	10.83
Z095	*Micropsectra*	7	2.23
Z320	*Paratanytarsus*	4	1.27
Z375	*Polypedilum*	2	0.64
Z480	*Pseudochironomus*	31	9.87
Z540	*Rheotanytarsus*	2	0.64
	TOTAL: CHIRONOMIDAE	96	30.57
	GRAND TOTAL	314	100.00

Leptophebia is a tentative identification
Palmacorixa gillettei, Palmacorixa buenoi, Sigara, Trichocorixa borealis

Box Elder Creek, Pool, July 18, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
D150	*Sphaerium*	1	0.21
D420	*Ferrissia*	8	1.68
D670	*Physella*	1	0.21
	TOTAL: MISC. TAXA	10	2.11
G600	Coenagrionidae	67	14.11
	TOTAL: ODONATA	67	14.11
H180	*Callibaetis*	21	4.42
H284	*Diphetor hageni*	14	2.95
I470	*Stenonema*	2	0.42
	TOTAL: EPHEMEROPTERA	37	7.79
L100	Corixidae	186	39.16
L585	*Ambrysus*	1	0.21
	TOTAL: HEMIPTERA	187	39.37
M550	*Sialis*	2	0.42
	TOTAL: MEGALOPTERA	2	0.42
N690	*Cheumatopsyche*	4	0.84
O630	*Oecetis*	3	0.63
P450	*Polycentropus*	1	0.21
	TOTAL: TRICOPTERA	8	1.68
S170	*Dubiraphia*	5	1.05
	TOTAL: COLEOPTERA	5	1.05
Y400	*Conchapelopia/Thienemannimyia*	1	0.21
Y460	*Cricotopus*	4	0.84
Y580	*Cryptochironomus*	1	0.21
Y590	*Cryptotendipes*	1	0.21
Y630	*Dicrotendipes*	21	4.42
Y750	*Eukiefferiella*	1	0.21
Z320	*Paratanytarsus*	2	0.42
Z375	*Polypedilum*	16	3.37
Z480	*Pseudochironomus*	109	22.95
Z630	*Tanytarsus*	3	0.63
	TOTAL: CHIRONOMIDAE	159	33.47
	GRAND TOTAL	475	100.00

see taxa annotations on other sample

East Fork Bull River, Sept. 2, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
A150	Turbellaria	4	1.04
A300	Nematoda	1	0.26
	TOTAL: MISC. TAXA	5	1.30
H142	*Baetis tricaudatus*	35	9.11
H670	*Caudatella hystrix*	1	0.26
H705	*Drunella coloradensis*	3	0.78
H710	*Drunella doddsi*	43	11.20
I150	*Cinygmula*	5	1.30
I205	*Epeorus albertae*	29	7.55
I215	*Epeorus longimanus*	1	0.26
I220	*Epeorus grandis*	84	21.88
I420	*Rhithrogena*	97	25.26
	TOTAL: EPHEMEROPTERA	298	77.60
J470	*Sweltsa*	1	0.26
J959	*Zapada columbiana*	13	3.39
K130	*Doroneuria*	1	0.26
K550	*Megarcys*	4	1.04
K785	*Yoraperla*	5	1.30
K900	Taeniopterygidae	1	0.26
	TOTAL: PLECOPTERA	25	6.51
N089	*Parapsyche elsis*	17	4.43
N450	*Glossosoma*	3	0.78
P622	*Rhyacophila Betteni Gr.*	3	0.78
P656	*Rhyacophila Hyalinata Gr.*	8	2.08
P662	*Rhyacophila Iranda Gr.*	1	0.26
	TOTAL: TRICOPTERA	32	8.33
W390	*Prosimulium*	3	0.78
	TOTAL: DIPTERA	3	0.78
Y150	*Brillia*	4	1.04
Y750	*Eukiefferiella*	4	1.04
Z095	*Micropsectra*	4	1.04
Z725	*Tvetenia*	9	2.34
	TOTAL: CHIRONOMIDAE	21	5.47
	GRAND TOTAL	384	100.00

Calf Creek, Sept 6, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
File: 90CA2FFA A,B,C

TAXACODE	Taxon	RA	%
A150	Turbellaria	1	0.22
D500	Lymnaeidae	1	0.22
F000	Acari	3	0.66
	TOTAL: MISC. TAXA	5	1.10
H060	*Baetis*	15	3.29
H670	*Caudatella hystrix*	2	0.44
H710	*Drunella doddsi*	8	1.75
H715	*Drunella grandis*	21	4.61
H765	*Ephemerella inermis*	10	2.19
I150	*Cinygmula*	60	13.16
I420	*Rhithrogena*	4	0.88
I600	*Paraleptophlebia*	12	2.63
I900	*Ameletus*	2	0.44
	TOTAL: EPHEMEROPTERA	134	29.39
J470	*Sweltsa*	4	0.88
J780	*Malenka*	2	0.44
J956	*Zapada cinctipes*	28	6.14
K130	*Doroneuria*	7	1.54
K200	*Hesperoperla pacifica*	6	1.32
K440	*Isogenoides*	4	0.88
K670	*Skwala*	15	3.29
	TOTAL: PLECOPTERA	66	14.47
N050	*Arctopsyche grandis*	6	1.32
N160	*Brachycentrus americanus*	4	0.88
N450	*Glossosoma*	5	1.10
O420	*Lepidostoma*	4	0.88
O730	*Apatania*	2	0.44
P180	*Dolophilodes*	3	0.66
P600	*Rhyacophila*	2	0.44
P630	*Rhyacophila Brunnea Gr.*	13	2.85
P686	*Rhyacophila narvae*	5	1.10
	TOTAL: TRICHOPTERA	44	9.65
S220	*Heterlimnius*	93	20.39
S320	*Optioservus*	35	7.68
S440	*Zaitzevia*	9	1.97
	TOTAL: COLEOPTERA	137	30.04
V530	*Chelifera*	3	0.66
V950	Pelecorhynchidae	2	0.44
W040	*Pericoma*	10	2.19
W300	Simuliidae	2	0.44
X560	*Antocha*	11	2.41
	TOTAL: DIPTERA	28	6.14

Calf Creek, Sept 6, 1990 cont.

Y001	Chironomidae-pupae	2	0.44
Y400	*Conchapelopia/Thienemannimyia*	2	0.44
Y750	*Eukiefferiella*	8	1.75
Z095	*Micropsectra*	6	1.32
Z195	*Orthocladius*	10	2.19
Z230	*Pagastia*	2	0.44
Z540	*Rheotanytarsus*	4	0.88
Z725	*Tvetenia*	8	1.75
	TOTAL: CHIRONOMIDAE	42	9.21
	GRAND TOTAL	456	100.00

Crooked River above Tillett Ranch, #1, July 10, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
A150	Turbellaria	2	0.65
B000	Oligochaeta	4	1.31
	TOTAL: MISC. TAXA	6	1.96
H142	*Baetis tricaudatus*	170	55.56
H284	*Diphetor hageni*	8	2.61
H705	*Drunella coloradensis*	2	0.65
H870	*Serratella tibialis*	18	5.88
I150	*Cinygmula*	26	8.50
I215	*Epeorus longimanus*	26	8.50
I900	*Ameletus*	6	1.96
	TOTAL: EPHEMEROPTERA	256	83.66
J780	*Malenka*	2	0.65
K520	*Kogotus*	2	0.65
	TOTAL: PLECOPTERA	4	1.31
N160	*Brachycentrus americanus*	8	2.61
N800	*Hydropsyche*	6	1.96
O420	*Lepidostoma*	2	0.65
P630	*Rhyacophila Brunnea Gr.*	18	5.88
	TOTAL: TRICOPTERA	34	11.11
Z095	*Micropsectra*	2	0.65
Z725	*Tvetenia*	4	1.31
	TOTAL: CHIRONOMIDAE	6	1.96
	GRAND TOTAL	306	100.00

Oreodytes, Optioservus seriatus

Crooked River above Tillett Ranch, #2, July 10, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
A150	Turbellaria	2	0.57
B000	Oligochaeta	4	1.14
	TOTAL: MISC. TAXA	6	1.70
H142	*Baetis tricaudatus*	176	50.00
H284	*Diphetor hageni*	3	0.85
H705	*Drunella coloradensis*	3	0.85
H870	*Serratella tibialis*	66	18.75
I150	*Cinygmula*	19	5.40
I215	*Epeorus longimanus*	20	5.68
	TOTAL: EPHEMEROPTERA	287	81.53
K200	*Hesperoperla pacifica*	1	0.28
K450	*Isoperla*	2	0.57
K520	*Kogotus*	1	0.28
K815	*Pteronarcella badia*	1	0.28
	TOTAL: PLECOPTERA	5	1.42
N170	*Brachycentrus occidentalis*	5	1.42
N800	*Hydropsyche*	3	0.85
O070	*Hydroptila*	2	0.57
O485	Lepidostoma-turret case larvae	2	0.57
P610	*Rhyacophila Angelita Gr.*	2	0.57
P630	*Rhyacophila Brunnea Gr.*	5	1.42
	TOTAL: TRICOPTERA	19	5.40
R200	Dytiscidae	1	0.28
S320	*Optioservus*	1	0.28
	TOTAL: COLEOPTERA	2	0.57
V530	*Chelifera*	3	0.85
W450	*Simulium*	5	1.42
	TOTAL: DIPTERA	8	2.27
Y460	*Cricotopus*	1	0.28
Y750	*Eukiefferiella*	17	4.83
Z195	*Orthocladius*	6	1.70
Z725	*Tvetenia*	1	0.28
	TOTAL: CHIRONOMIDAE	25	7.10
	GRAND TOTAL	352	100.00

see taxa annotations on other sample

Elk Creek, July 10, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
File: 90ELKFA A,B,C

TAXACODE	Taxon	RA	%
B000	Oligochaeta	2	0.14
D670	*Physella*	14	0.97
	TOTAL: MISC. TAXA	16	1.10
H142	*Baetis tricaudatus*	46	3.17
H284	*Diphetor hageni*	32	2.21
H640	*Attenella margarita*	42	2.90
H715	*Drunella grandis*	2	0.14
H765	*Ephemerella inermis*	52	3.59
H870	*Serratella tibialis*	14	0.97
I250	*Heptagenia*	16	1.10
I600	*Paraleptophlebia*	2	0.14
I990	*Tricorythodes minutus*	30	2.07
	TOTAL: EPHEMEROPTERA	236	16.28
K815	*Pteronarcella badia*	42	2.90
	TOTAL: PLECOPTERA	42	2.90
N130	*Amiocentrus aspilus*	46	3.17
N160	*Brachycentrus americanus*	70	4.83
N170	*Brachycentrus occidentalis*	44	3.03
N210	*Micrasema*	2	0.14
N320	*Agapetus*	28	1.93
N500	*Protoptila*	18	1.24
N575	*Helicopsyche borealis*	2	0.14
N800	*Hydropsyche*	72	4.97
O220	*Neotrichia*	4	0.28
O420	*Lepidostoma*	2	0.14
P630	*Rhyacophila Brunnea Gr.*	2	0.14
	TOTAL: TRICHOPTERA	290	20.00
R930	Oreodytes	10	0.69
S320	Optioservus	332	22.90
S440	Zaitzevia	64	4.41
	TOTAL: COLEOPTERA	406	28.00
U450	Ceratopogonidae	76	5.24
W300	Simuliidae	6	0.41
X610	*Dicranota*	2	0.14
X670	*Hexatoma*	28	1.93
	TOTAL: DIPTERA	112	7.72
Y001	Chironomidae-pupae	4	0.28
Y340	*Cladotanytarsus*	8	0.55
Y460	*Cricotopus*	12	0.83
Y750	*Eukiefferiella*	32	2.21
Z095	*Micropsectra*	148	10.21
Z195	*Orthocladius*	12	0.83
Z285	*Parakiefferiella*	36	2.48
Z305	*Parametriocnemus*	4	0.28
Z320	*Paratanytarsus*	4	0.28
Z630	*Tanytarsus*	40	2.76
Z725	*Tvetenia*	48	3.31
	TOTAL: CHIRONOMIDAE	348	24.00
	GRAND TOTAL	1450	100.00

S.F.Flathead R. above Bunker Cr., August 31, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
H142	*Baetis tricaudatus*	17	8.54
H710	*Drunella doddsi*	61	30.65
H870	*Serratella tibialis*	3	1.51
I150	*Cinygmula*	2	1.01
I205	*Epeorus albertae*	69	34.67
I215	*Epeorus longimanus*	2	1.01
I420	*Rhithrogena*	24	12.06
	TOTAL: EPHEMEROPTERA	178	89.45
K125	*Claassenia sabulosa*	3	1.51
K200	*Hesperoperla pacifica*	2	1.01
K815	*Pteronarcella badia*	2	1.01
	TOTAL: PLECOPTERA	7	3.52
N050	*Arctopsyche grandis*	8	4.02
	TOTAL: TRICOPTERA	8	4.02
S320	*Optioservus*	2	1.01
	TOTAL: COLEOPTERA	2	1.01
X670	*Hexatoma*	2	1.01
	TOTAL: DIPTERA	2	1.01
Z725	*Tvetenia*	2	1.01
	TOTAL: CHIRONOMIDAE	2	1.01
	GRAND TOTAL	199	100.00

Bukantis removed 13/32. Data has been adjusted to reflect this.

Four Mile Creek, Sept 13, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
File: 90FOURFA A,B,C

TAXACODE	Taxon	RA	%
A150	Turbellaria	14	2.52
A300	Nematoda	7	1.26
E100	Cladocera	1	0.18
F000	Acari	1	0.18
	TOTAL: MISC. TAXA	23	4.14
H142	*Baetis tricaudatus*	7	1.26
H710	*Drunella doddsi*	25	4.50
H715	*Drunella grandis*	11	1.98
H765	*Ephemerella inermis*	8	1.44
I150	*Cinygmula*	46	8.29
I205	*Epeorus albertae*	2	0.36
I215	*Epeorus longimanus*	1	0.18
I220	*Epeorus grandis*	8	1.44
I420	*Rhithrogena*	181	32.61
I900	*Ameletus*	8	1.44
	TOTAL: EPHEMEROPTERA	297	53.51
J020	Capniidae	1	0.18
J470	*Sweltsa*	3	0.54
J956	*Zapada cinctipes*	1	0.18
J959	*Zapada columbiana*	22	3.96
J977	*Zapada Oregonensis Gr.*	28	5.05
K130	*Doroneuria*	14	2.52
K550	*Megarcys*	9	1.62
K900	Taeniopterygidae	2	0.36
	TOTAL: PLECOPTERA	80	14.41
N089	*Parapsyche elsis*	18	3.24
N210	*Micrasema*	20	3.60
N375	*Anagapetus*	1	0.18
O730	*Apatania*	30	5.41
O805	*Ecclisomyia*	8	1.44
P622	*Rhyacophila Betteni Gr.*	11	1.98
P630	*Rhyacophila Brunnea Gr.*	1	0.18
P656	*Rhyacophila Hyalinata Gr.*	10	1.80
P686	*Rhyacophila narvae*	2	0.36
P704	*Rhyacophila pellisa*	2	0.36
P870	*Neophylax*	14	2.52
P915	*Neothremma alicia*	3	0.54
	TOTAL: TRICHOPTERA	120	21.62
S220	*Heterlimnius*	4	0.72
	TOTAL: COLEOPTERA	4	0.72
V560	*Clinocera*	2	0.36
W300	Simuliidae	2	0.36
X610	*Dicranota*	2	0.36
X870	*Tipula*	1	0.18
	TOTAL: DIPTERA	7	1.26

Four Mile Creek, Sept 13, 1990.

TAXACODE	Taxon	MEAN	%
Y001	Chironomidae-pupae	1	0.18
Y150	*Brillia*	4	0.72
Y460	*Cricotopus*	2	0.36
Y520	*Cricotopus Nostococladius*	11	1.98
Z195	*Orthocladius*	2	0.36
Z230	*Pagastia*	4	0.72
	TOTAL: CHIRONOMIDAE	24	4.32
	GRAND TOTAL	555	100.00

West Gallatin River, Sept. 4, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
B000	Oligochaeta	12	1.46
	TOTAL: MISC. TAXA	12	1.46
H142	*Baetis tricaudatus*	72	8.78
H028	*Acentrella turbida*	8	0.98
H710	*Drunella doddsi*	74	9.02
H715	*Drunella grandis*	14	1.71
H870	*Serratella tibialis*	2	0.24
I420	*Rhithrogena*	2	0.24
	TOTAL: EPHEMEROPTERA	172	20.98
J470	*Sweltsa*	2	0.24
K200	*Hesperoperla pacifica*	26	3.17
K670	*Skwala*	4	0.49
K835	*Pteronarcys californica*	16	1.95
	TOTAL: PLECOPTERA	48	5.85
N050	*Arctopsyche grandis*	26	3.17
N170	*Brachycentrus occidentalis*	78	9.51
N450	*Glossosoma*	268	32.68
N690	*Cheumatopsyche*	2	0.24
N800	*Hydropsyche*	50	6.10
	TOTAL: TRICOPTERA	424	51.71
U210	*Atherix*	50	6.10
U320	*Bibiocephala*	6	0.73
V560	*Clinocera*	2	0.24
W300	Simuliidae	14	1.71
X670	*Hexatoma*	40	4.88
	TOTAL: DIPTERA	112	13.66
Y230	*Cardiocladius*	2	0.24
Y460	*Cricotopus*	4	0.49
Y750	*Eukiefferiella*	8	0.98
Z195	*Orthocladius*	34	4.15
Z320	*Paratanytarsus*	4	0.49
	TOTAL: CHIRONOMIDAE	52	6.34
	GRAND TOTAL	820	100.00

Optioservus quadrimaculatus, Bibiocephala grandis

Hanging Woman Creek near Birney, July 19, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
B000	Oligochaeta	672	3.93
D670	*Physella*	8032	46.96
D700	*Gyraulus*	192	1.12
E100	Cladocera	416	2.43
E200	Copepoda	128	0.75
E300	Ostracoda	224	1.31
E660	*Hyallela azteca*	16	0.09
	TOTAL: MISC. TAXA	9680	56.59
G300	Libellulidae	48	0.28
G600	Coenagrionidae	1104	6.45
	TOTAL: ODONATA	1152	6.74
H180	*Callibaetis*	832	4.86
H490	*Caenis*	3104	18.15
	TOTAL: EPHEMEROPTERA	3936	23.01
L080	*Lethocerus*	32	0.19
L100	Corixidae	16	0.09
L360	*Gerris*	80	0.47
L560	*Mesovelia*	32	0.19
	TOTAL: HEMIPTERA	160	0.94
O070	*Hydroptila*	80	0.47
	TOTAL: TRICOPTERA	80	0.47
R200	Dytiscidae	16	0.09
S170	*Dubiraphia*	16	0.09
S680	*Peltodytes*	80	0.47
T000	Hydrophilidae	16	0.09
	TOTAL: COLEOPTERA	128	0.75
U450	Ceratopogonidae	544	3.18
V010	*Aedes*	16	0.09
V100	*Anopheles*	160	0.94
W600	Stratiomyiidae	32	0.19
	TOTAL: DIPTERA	752	4.40
Y020	*Ablabesmyia*	48	0.28
Y520	*Cricotopus Nostococladius*	96	0.56
Y710	*Endochironomus*	16	0.09
Z050	*Labrundinia*	64	0.37
Z320	*Paratanytarsus*	64	0.37
Z440	*Psectrocladius*	160	0.94
Z480	*Pseudochironomus*	480	2.81
Z620	*Tanypus*	96	0.56
Z630	*Tanytarsus*	192	1.12
	TOTAL: CHIRONOMIDAE	1216	7.11
	GRAND TOTAL	17104	100.00

Physella propinqua nuttalli, Physella gyrina, Gyraulus parvus
Sigara, Agabus, Berosus

Larb Creek, near mouth, near Saco, July 17, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
A110	*Hydra*	20	1.52
B000	Oligochaeta	72	5.47
D670	*Physella*	196	14.89
D700	*Gyraulus*	376	28.57
E100	Cladocera	28	2.13
E300	Ostracoda	4	0.30
E660	*Hyallela azteca*	48	3.65
F000	Acari	28	2.13
	TOTAL: MISC. TAXA	772	58.66
G300	Libellulidae	8	0.61
G600	Coenagrionidae	96	7.29
	TOTAL: ODONATA	104	7.90
H180	*Callibaetis*	72	5.47
H468	~~Caenidae~~ Caenis	56	4.26
	TOTAL: EPHEMEROPTERA	128	9.73
L080	*Lethocerus*	4	0.30
L100	Corixidae	208	15.81
L680	*Notonecta*	8	0.61
	TOTAL: HEMIPTERA	220	16.72
N800	*Hydropsyche*	4	0.30
P250	Phryganeidae	8	0.61
P450	*Polycentropus*	8	0.61
	TOTAL: TRICOPTERA	20	1.52
S170	*Dubiraphia*	8	0.61
S620	*Haliplus*	4	0.30
T000	Hydrophilidae	4	0.30
	TOTAL: COLEOPTERA	16	1.22
U450	Ceratopogonidae	8	0.61
	TOTAL: DIPTERA	8	0.61
Y460	*Cricotopus*	4	0.30
Y630	*Dicrotendipes*	16	1.22
Z250	*Parachironomus*	4	0.30
Z320	*Paratanytarsus*	16	1.22
Z365	*Phaenopsectra*	4	0.30
Z375	*Polypedilum*	4	0.30
	TOTAL: CHIRONOMIDAE	48	3.65
	GRAND TOTAL	1316	100.00

Gyraulus parvus, Physella propinqua, Physella lordi
Caenis cf. latipennis, Palmacorixa buenoi, Palmacorixa gillettei (dominant)

Odell Creek, RBP1, July 8, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
B000	Oligochaeta	60	3.60
D580	*Stagnicola*	148	8.87
D700	*Gyraulus*	8	0.48
	TOTAL: MISC. TAXA	216	12.95
H142	*Baetis tricaudatus*	30	1.80
H284	*Diphetor hageni*	2	0.12
H640	*Attenella margarita*	34	2.04
I990	*Tricorythodes minutus*	42	2.52
	TOTAL: EPHEMEROPTERA	108	6.47
K125	*Claassenia sabulosa*	4	0.24
K200	*Hesperoperla pacifica*	16	0.96
K450	*Isoperla*	2	0.12
K670	*Skwala*	4	0.24
K835	*Pteronarcys californica*	4	0.24
	TOTAL: PLECOPTERA	30	1.80
N130	*Amiocentrus aspilus*	2	0.12
N160	*Brachycentrus americanus*	4	0.24
N170	*Brachycentrus occidentalis*	118	7.07
N450	*Glossosoma*	136	8.15
N575	*Helicopsyche borealis*	134	8.03
N800	*Hydropsyche*	18	1.08
P630	*Rhyacophila Brunnea Gr.*	6	0.36
	TOTAL: TRICOPTERA	418	25.06
S320	Optioservus	742	44.48
S450	Zaitzevia parvula	4	0.24
	TOTAL: COLEOPTERA	746	44.72
W390	*Prosimulium*	4	0.24
W450	*Simulium*	10	0.60
X560	*Antocha*	4	0.24
	TOTAL: DIPTERA	18	1.08
Y460	*Cricotopus*	22	1.32
Y750	*Eukiefferiella*	6	0.36
Z095	*Micropsectra*	2	0.12
Z195	*Orthocladius*	18	1.08
Z230	*Pagastia*	2	0.12
Z320	*Paratanytarsus*	2	0.12
Z375	*Polypedilum*	54	3.24
Z540	*Rheotanytarsus*	14	0.84
Z585	*Sublettea*	6	0.36
Z685	*Thienemanniella*	6	0.36
	TOTAL: CHIRONOMIDAE	132	7.91
	GRAND TOTAL	1668	100.00

Lumbriculidae, Lumbricina, Stagnicola elrodi, Gyraulus parvus
Optioservus quadrimaculatus

Odell Creek, RBP2, July 8, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
A300	Nematoda	2	0.26
B000	Oligochaeta	4	0.51
D670	*Physella*	48	6.15
F000	Acari	4	0.51
	TOTAL: MISC. TAXA	58	7.44
H142	*Baetis tricaudatus*	32	4.10
H284	*Diphetor hageni*	12	1.54
H640	*Attenella margarita*	26	3.33
I990	*Tricorythodes minutus*	22	2.82
	TOTAL: EPHEMEROPTERA	92	11.79
K125	*Claassenia sabulosa*	4	0.51
K200	*Hesperoperla pacifica*	6	0.77
K670	*Skwala*	6	0.77
	TOTAL: PLECOPTERA	16	2.05
N130	*Amiocentrus aspilus*	2	0.26
N170	*Brachycentrus occidentalis*	36	4.62
N450	*Glossosoma*	18	2.31
N500	*Protoptila*	18	2.31
N575	*Helicopsyche borealis*	2	0.26
N800	*Hydropsyche*	10	1.28
P220	*Wormaldia*	2	0.26
P600	*Rhyacophila*	2	0.26
P630	*Rhyacophila Brunnea Gr.*	2	0.26
	TOTAL: TRICOPTERA	92	11.79
S320	*Optioservus*	342	43.85
	TOTAL: COLEOPTERA	342	43.85
W390	*Prosimulium*	4	0.51
W450	*Simulium*	14	1.79
X560	*Antocha*	4	0.51
	TOTAL: DIPTERA	22	2.82
Y400	*Conchapelopia/Thienemannimyia*	8	1.03
Y460	*Cricotopus*	26	3.33
Y750	*Eukiefferiella*	16	2.05
Z095	*Micropsectra*	2	0.26
Z195	*Orthocladius*	38	4.87
Z375	*Polypedilum*	24	3.08
Z540	*Rheotanytarsus*	20	2.56
Z585	*Sublettea*	16	2.05
Z600	*Sympotthastia*	2	0.26
Z725	*Tvetenia*	6	0.77
	TOTAL: CHIRONOMIDAE	158	20.26
	GRAND TOTAL	780	100.00

see taxa annotations for other sample

O'Fallon Creek at Hwy. 12. July 18, 1990

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
D670	*Physella*	8	1.22
E100	Cladocera	4	0.61
	TOTAL: MISC. TAXA	12	1.83
G600	Coenagrionidae	52	7.93
	TOTAL: ODONATA	52	7.93
H180	*Callibaetis*	40	6.10
H490	*Caenis*	44	6.71
	TOTAL: EPHEMEROPTERA	84	12.80
L100	Corixidae	328	50.00
	TOTAL: HEMIPTERA	328	50.00
U450	Ceratopogonidae	28	4.27
	TOTAL: DIPTERA	28	4.27
Y340	*Cladotanytarsus*	24	3.66
Y400	*Conchapelopia/Thienemannimyia*	4	0.61
Y580	*Cryptochironomus*	4	0.61
Y590	*Cryptotendipes*	12	1.83
Z250	*Parachironomus*	4	0.61
Z290	*Paralauterborniella*	4	0.61
Z330	*Paratendipes*	4	0.61
Z400	*Procladius*	32	4.88
Z480	*Pseudochironomus*	44	6.71
Z620	*Tanypus*	20	3.05
	TOTAL: CHIRONOMIDAE	152	23.17
	GRAND TOTAL	656	100.00

Caenis cf. latipennis, Coenagrion/Enallagma (dominant)
Sigara (dominant), Palmacorixa gillettei, Trichocorixa borealis

Pine Creek, July 26, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
File: 90PINEFA A,B,C

TAXACODE	Taxon	RA	%
A150	Turbellaria	26	8.02
A300	Nematoda	1	0.31
	TOTAL: MISC. TAXA	27	8.33
H705	*Drunella coloradensis*	2	0.62
H870	*Serratella tibialis*	18	5.56
I050	*Cinygma*	10	3.09
I200	*Epeorus*	3	0.93
I220	*Epeorus grandis*	5	1.54
I900	*Ameletus*	2	0.62
	TOTAL: EPHEMEROPTERA	40	12.35
J470	*Sweltsa*	2	0.62
J959	*Zapada columbiana*	8	2.47
J977	*Zapada Oregonensis Gr.*	5	1.54
K550	*Megarcys*	5	1.54
K785	*Yoraperla*	89	27.47
	TOTAL: PLECOPTERA	109	33.64
N089	*Parapsyche elsis*	1	0.31
N210	*Micrasema*	17	5.25
O420	*Lepidostoma*	1	0.31
P630	*Rhyacophila Brunnea Gr.*	4	1.23
P746	*Rhyacophila Vemna*	1	0.31
P915	*Neothremma alicia*	61	18.83
	TOTAL: TRICHOPTERA	85	26.23
S220	*Heterlimnius*	4	1.23
	TOTAL: COLEOPTERA	4	1.23
V500	Empididae	1	0.31
V530	*Chelifera*	1	0.31
V550	~~*Chelipoda*~~ Hemerodromia	1	0.31
V950	Pelecorhynchidae	1	0.31
W300	Simuliidae	2	0.62
	TOTAL: DIPTERA	6	1.85
Y001	Chironomidae-pupae	1	0.31
Y150	*Brillia*	2	0.62
Y750	*Eukiefferiella*	10	3.09
Z095	*Micropsectra*	20	6.17
Z195	*Orthocladius*	2	0.62
Z305	*Parametriocnemus*	2	0.62
Z565	*Stempellinella*	2	0.62
Z630	*Tanytarsus*	6	1.85
Z725	*Tvetenia*	8	2.47
	TOTAL: CHIRONOMIDAE	53	16.36
	GRAND TOTAL	324	100.00

W.F. Poplar River at Hwy. 13. RBP 04-1A, Aug. 22, 19

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
A300	Nematoda	24	0.49
D670	*Physella*	56	1.14
D700	*Gyraulus*	8	0.16
E100	Cladocera	8	0.16
E660	*Hyallela azteca*	88	1.79
E860	*Pacifasticus*	8	0.16
	TOTAL: MISC. TAXA	192	3.91
G600	Coenagrionidae	176	3.58
	TOTAL: ODONATA	176	3.58
H060	*Baetis*	32	0.65
H180	*Callibaetis*	112	2.28
I470	*Stenonema*	8	0.16
	TOTAL: EPHEMEROPTERA	152	3.09
L560	*Mesovelia*	8	0.16
L680	*Notonecta*	8	0.16
	TOTAL: HEMIPTERA	16	0.33
N690	*Cheumatopsyche*	392	7.98
O070	*Hydroptila*	8	0.16
P520	*Psychomyia*	8	0.16
	TOTAL: TRICOPTERA	408	8.31
R200	Dytiscidae	8	0.16
	TOTAL: COLEOPTERA	8	0.16
W450	*Simulium*	3648	74.27
X100	Tabanidae	8	0.16
	TOTAL: DIPTERA	3656	74.43
Y400	*Conchapelopia/Thienemannimyia*	48	0.98
Y630	*Dicrotendipes*	8	0.16
Z050	*Labrundinia*	16	0.33
Z095	*Micropsectra*	24	0.49
Z195	*Orthocladius*	8	0.16
Z320	*Paratanytarsus*	8	0.16
Z440	*Psectrocladius*	32	0.65
Z540	*Rheotanytarsus*	160	3.26
	TOTAL: CHIRONOMIDAE	304	6.19
	GRAND TOTAL	4912	100.00

see taxa annotations for other sample

W.F. Poplar R. at Hwy. 13, RBP 04-1B, Aug 22, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
File: 90POPBFA A,B,C

TAXACODE	Taxon	RA	%
A001	Porifera	6	0.59
A300	Nematoda	4	0.39
C010	Hirudinea	6	0.59
D420	*Ferrissia*	2	0.20
D670	*Physella*	18	1.77
D690	Planorbidae	2	0.20
E550	*Gammarus*	8	0.79
E660	*Hyallela azteca*	114	11.20
E860	*Pacifasticus*	2	0.20
	TOTAL: MISC. TAXA	162	15.91
G600	*Coenagrion/Enallagma*	14	1.38
	TOTAL: ODONATA	14	1.38
H060	*Baetis*	84	8.25
H180	*Callibaetis*	16	1.57
H468	~~Caenidae~~ Caenis	8	0.79
I470	*Stenonema*	2	0.20
I500	Leptophlebiidae	2	0.20
I790	*Isonychia*	50	4.91
I990	*Tricorythodes minutus*	14	1.38
	TOTAL: EPHEMEROPTERA	176	17.29
L100	Corixidae	8	0.79
L560	*Mesovelia*	12	1.18
	TOTAL: HEMIPTERA	20	1.96
N690	*Cheumatopsyche*	50	4.91
O070	*Hydroptila*	16	1.57
P450	*Polycentropus*	4	0.39
P520	*Psychomyia*	8	0.79
	TOTAL: TRICHOPTERA	78	7.66
R200	Dytiscidae	2	0.20
S600	Haliplidae	2	0.20
	TOTAL: COLEOPTERA	4	0.39
W300	Simuliidae	378	37.13
X610	*Dicranota*	6	0.59
	TOTAL: DIPTERA	384	37.72
Y001	Chironomidae-pupae	20	1.96
Y400	*Conchapelopia/Thienemannimyia*	16	1.57
Y450	*Corynoneura*	4	0.39
Y460	*Cricotopus*	12	1.18
Y630	*Dicrotendipes*	4	0.39
Z025	*Larsia*	4	0.39
Z050	*Labrundinia*	4	0.39
Z095	*Micropsectra*	20	1.96
Z120	*Nanocladius*	4	0.39
Z320	*Paratanytarsus*	12	1.18
Z540	*Rheotanytarsus*	76	7.47
Z630	*Tanytarsus*	4	0.39
	TOTAL: CHIRONOMIDAE	180	17.68
	GRAND TOTAL	1018	100.00

W.F. Poplar R. at Hwy. 13, Veg. sample. Aug. 22, 199

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
A110	*Hydra*	260	19.70
A300	Nematoda	4	0.30
D670	*Physella*	60	4.55
D700	*Gyraulus*	36	2.73
E100	Cladocera	8	0.61
E200	Copepoda	4	0.30
E660	*Hyallela azteca*	144	10.91
	TOTAL: MISC. TAXA	516	39.09
G600	Coenagrionidae	48	3.64
	TOTAL: ODONATA	48	3.64
H060	*Baetis*	292	22.12
H490	*Caenis*	4	0.30
	TOTAL: EPHEMEROPTERA	296	22.42
O000	Hydroptilidae	12	0.91
O070	*Hydroptila*	16	1.21
O600	*Nectopsyche*	4	0.30
P450	*Polycentropus*	4	0.30
	TOTAL: TRICOPTERA	36	2.73
W390	*Prosimulium*	24	1.82
W450	*Simulium*	164	12.42
	TOTAL: DIPTERA	188	14.24
Y400	*Conchapelopia/Thienemannimyia*	8	0.61
Y450	*Corynoneura*	4	0.30
Y460	*Cricotopus*	32	2.42
Y630	*Dicrotendipes*	16	1.21
Z095	*Micropsectra*	44	3.33
Z120	*Nanocladius*	56	4.24
Z540	*Rheotanytarsus*	76	5.76
	TOTAL: CHIRONOMIDAE	236	17.88
	GRAND TOTAL	1320	100.00

Gyraulus parvus, Physella lordi, Physella ? sp.
Sigara, Agabus, Cricotopus Trifasciata Gr., Cricotopus Tremulus Gr.

Baetis flavistriga: Dr. Waltz is interested in obtaining an adult and larval series of this taxa.

Redwater R. at Hwy. 201, RBP 06-1, August 23, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
E860	*Pacifasticus*	20	7.69
	TOTAL: MISC. TAXA	20	7.69
G600	Coenagrionidae	80	30.77
	TOTAL: ODONATA	80	30.77
H490	*Caenis*	20	7.69
	TOTAL: EPHEMEROPTERA	20	7.69
L100	Corixidae	12	4.62
	TOTAL: HEMIPTERA	12	4.62
S170	*Dubiraphia*	4	1.54
	TOTAL: COLEOPTERA	4	1.54
Y400	*Conchapelopia/Thienemannimyia*	4	1.54
Y630	*Dicrotendipes*	36	13.85
Y710	*Endochironomus*	12	4.62
Y860	*Glyptotendipes*	4	1.54
Z095	*Micropsectra*	56	21.54
Z320	*Paratanytarsus*	12	4.62
	TOTAL: CHIRONOMIDAE	124	47.69
	GRAND TOTAL	260	100.00

see taxa annotations on other sample

Redwater R. at Hwy. 201, Veg. Sample, August 23, 19

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
B000	Oligochaeta	72	9.47
D670	*Physella*	88	11.58
E100	Cladocera	4	0.53
E660	*Hyallela azteca*	116	15.26
	TOTAL: MISC. TAXA	280	36.84
G600	Coenagrionidae	60	7.89
	TOTAL: ODONATA	60	7.89
H180	*Callibaetis*	8	1.05
H490	*Caenis*	8	1.05
	TOTAL: EPHEMEROPTERA	16	2.11
P450	*Polycentropus*	4	0.53
	TOTAL: TRICOPTERA	4	0.53
R200	Dytiscidae	4	0.53
S620	*Haliplus*	4	0.53
	TOTAL: COLEOPTERA	8	1.05
U450	Ceratopogonidae	4	0.53
V000	Culicidae	4	0.53
	TOTAL: DIPTERA	8	1.05
Y460	*Cricotopus*	32	4.21
Y630	*Dicrotendipes*	196	25.79
Z120	*Nanocladius*	4	0.53
Z195	*Orthocladius*	48	6.32
Z375	*Polypedilum*	44	5.79
Z480	*Pseudochironomus*	12	1.58
Z540	*Rheotanytarsus*	8	1.05
Z585	*Sublettea*	4	0.53
Z620	*Tanypus*	4	0.53
Z630	*Tanytarsus*	32	4.21
	TOTAL: CHIRONOMIDAE	384	50.53
	GRAND TOTAL	760	100.00

Physella juveniles, Gyraulus parvus, Caenis cf. latipennis
Chaetogaster diaphanus, Nais variablis
Trichocorixa borealis, Sigara

Roaring Lion Creek, July 27, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
A150	Turbellaria	4	0.44
	TOTAL: MISC. TAXA	4	0.44
H142	*Baetis tricaudatus*	52	5.70
H705	*Drunella coloradensis*	4	0.44
H870	*Serratella tibialis*	40	4.39
I150	*Cinygmula*	12	1.32
I215	*Epeorus longimanus*	164	17.98
I220	*Epeorus grandis*	216	23.68
I420	*Rhithrogena*	12	1.32
	TOTAL: EPHEMEROPTERA	500	54.82
J956	*Zapada cinctipes*	4	0.44
J959	*Zapada columbiana*	40	4.39
J977	*Zapada Oregonensis Gr.*	4	0.44
K130	*Doroneuria*	4	0.44
K550	*Megarcys*	8	0.88
	TOTAL: PLECOPTERA	60	6.58
N050	*Arctopsyche grandis*	12	1.32
N210	*Micrasema*	4	0.44
O485	*Lepidostoma-turret case larvae*	4	0.44
P180	*Dolophilodes*	36	3.95
P602	*Rhyacophila Alberta Gr.*	4	0.44
P622	*Rhyacophila Betteni Gr.*	4	0.44
P630	*Rhyacophila Brunnea Gr.*	8	0.88
P656	*Rhyacophila Hyalinata Gr.*	4	0.44
P760	*Rhyacophial verrula*	4	0.44
P915	*Neothremma alicia*	12	1.32
	TOTAL: TRICOPTERA	92	10.09
W450	*Simulium*	12	1.32
X610	*Dicranota*	4	0.44
	TOTAL: DIPTERA	16	1.75
Y150	*Brillia*	20	2.19
Y400	*Conchapelopia/Thienemannimyia*	8	0.88
Y460	*Cricotopus*	12	1.32
Y750	*Eukiefferiella*	32	3.51
Z095	*Micropsectra*	64	7.02
Z195	*Orthocladius*	36	3.95
Z315	*Paraphaenocladius*	4	0.44
Z375	*Polypedilum*	16	1.75
Z515	*Rheocricotopus*	4	0.44
Z540	*Rheotanytarsus*	20	2.19
Z630	*Tanytarsus*	12	1.32
Z725	*Tvetenia*	12	1.32
	TOTAL: CHIRONOMIDAE	240	26.32
	GRAND TOTAL	912	100.00

Lake Fork Rock Creek, August 22, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
B000	Oligochaeta	4	0.69
	TOTAL: MISC. TAXA	4	0.69
H142	*Baetis tricaudatus*	112	19.31
H705	*Drunella coloradensis*	4	0.69
H710	*Drunella doddsi*	20	3.45
H870	*Serratella tibialis*	8	1.38
I150	*Cinygmula*	168	28.97
I205	*Epeorus albertae*	8	1.38
I420	*Rhithrogena*	8	1.38
I900	*Ameletus*	20	3.45
	TOTAL: EPHEMEROPTERA	348	60.00
J470	*Sweltsa*	4	0.69
J956	*Zapada cinctipes*	4	0.69
J959	*Zapada columbiana*	16	2.76
J977	*Zapada Oregonensis Gr.*	28	4.83
K130	*Doroneuria*	12	2.07
K200	*Hesperoperla pacifica*	20	3.45
	TOTAL: PLECOPTERA	84	14.48
N089	*Parapsyche elsis*	4	0.69
P622	*Rhyacophila Betteni Gr.*	4	0.69
P630	*Rhyacophila Brunnea Gr.*	12	2.07
P656	*Rhyacophila Hyalinata Gr.*	4	0.69
	TOTAL: TRICOPTERA	24	4.14
V530	*Chelifera*	12	2.07
W450	*Simulium*	4	0.69
	TOTAL: DIPTERA	16	2.76
Y450	*Corynoneura*	4	0.69
Y750	*Eukiefferiella*	8	1.38
Y950	*Hydrobaenus*	8	1.38
Z095	*Micropsectra*	8	1.38
Z195	*Orthocladius*	12	2.07
Z440	*Psectrocladius*	4	0.69
Z515	*Rheocricotopus*	20	3.45
Z565	*Stempellinella*	12	2.07
Z580	*Stilocladius*	4	0.69
Z685	*Thienemanniella*	4	0.69
Z725	*Tvetenia*	20	3.45
	TOTAL: CHIRONOMIDAE	104	17.93
	GRAND TOTAL	580	100.00

Rock Cr. NE of Hinsdale, RBP 03-1, August 22, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
A300	Nematoda	8	0.34
B000	Oligochaeta	248	10.53
E100	Cladocera	24	1.02
E550	Gammarus	8	0.34
E660	*Hyallela azteca*	168	7.13
E860	*Pacifasticus*	8	0.34
	TOTAL: MISC. TAXA	464	19.70
G600	Coenagrionidae	136	5.77
	TOTAL: ODONATA	136	5.77
H180	*Callibaetis*	8	0.34
H490	*Caenis*	160	6.79
	TOTAL: EPHEMEROPTERA	168	7.13
L100	Corixidae	96	4.08
L560	*Mesovelia*	8	0.34
	TOTAL: HEMIPTERA	104	4.42
N800	*Hydropsyche*	8	0.34
P450	*Polycentropus*	8	0.34
	TOTAL: TRICOPTERA	16	0.68
S500	Gyrinidae	8	0.34
S620	*Haliplus*	8	0.34
T000	Hydrophilidae	16	0.68
	TOTAL: COLEOPTERA	32	1.36
U450	Ceratopogonidae	48	2.04
V860	*Limnophora*	16	0.68
W450	*Simulium*	120	5.10
X100	Tabanidae	8	0.34
	TOTAL: DIPTERA	192	8.15
Y070	*Apedilum*	88	3.74
Y340	*Cladotanytarsus*	13	0.55
Y400	*Conchapelopia/Thienemannimyia*	88	3.74
Y460	*Cricotopus*	38	1.61
Y580	*Cryptochironomus*	13	0.55
Y630	*Dicrotendipes*	250	10.62
Y710	*Endochironomus*	163	6.92
Z095	*Micropsectra*	25	1.06
Z120	*Nanocladius*	13	0.55
Z195	*Orthocladius*	38	1.61
Z250	*Parachironomus*	25	1.06
Z320	*Paratanytarsus*	313	13.29
Z375	*Polypedilum*	38	1.61
Z400	*Procladius*	12	0.51
Z440	*Psectrocladius*	13	0.55
Z630	*Tanytarsus*	100	4.25
Z685	*Thienemanniella*	13	0.55
	TOTAL: CHIRONOMIDAE	1243	52.78
	GRAND TOTAL	2355	100.00

see taxa annotations for other sample

Rock Cr. NE of Hinsdale, Veg. Sam., August 22, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
B000	Oligochaeta	44	10.00
D690	Planorbidae	2	0.45
E100	Cladocera	6	1.36
E300	Ostracoda	2	0.45
E660	*Hyallela azteca*	86	19.55
	TOTAL: MISC. TAXA	140	31.82
G600	Coenagrionidae	46	10.45
	TOTAL: ODONATA	46	10.45
H284	*Diphetor hageni*	8	1.82
	TOTAL: EPHEMEROPTERA	8	1.82
O600	*Nectopsyche*	2	0.45
	TOTAL: TRICOPTERA	2	0.45
S170	*Dubiraphia*	4	0.91
	TOTAL: COLEOPTERA	4	0.91
Y020	*Ablabesmyia*	14	3.18
Y450	*Corynoneura*	2	0.45
Y460	*Cricotopus*	20	4.55
Y630	*Dicrotendipes*	72	16.36
Y710	*Endochironomus*	16	3.64
Y860	*Glyptotendipes*	2	0.45
Z050	*Labrundinia*	6	1.36
Z095	*Micropsectra*	2	0.45
Z195	*Orthocladius*	6	1.36
Z250	*Parachironomus*	4	0.91
Z320	*Paratanytarsus*	82	18.64
Z375	*Polypedilum*	2	0.45
Z630	*Tanytarsus*	12	2.73
	TOTAL: CHIRONOMIDAE	240	54.55
	GRAND TOTAL	440	100.00

Planorbella, Nais variablis, Coenagrion/Enallagma, nr. Zoniagrion
Gammarus lacustris, Trichocorixa naias

Seymour Creek, July 28, 1990

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACOD	Taxon	RA	%
A300	Nematoda	2	0.52
B000	Oligochaeta	7	1.81
F000	Acari	1	0.26
	TOTAL: MISC. TAXA	10	2.58
H142	*Baetis tricaudatus*	24	6.20
H660	*Caudatella edmundsi*	1	0.26
H670	*Caudatella hystrix*	3	0.78
H705	*Drunella coloradensis*	4	1.03
H710	*Drunella doddsi*	14	3.62
H725	*Drunella spinifera*	10	2.58
H765	*Ephemerella inermis*	2	0.52
H870	*Serratella tibialis*	17	4.39
I150	*Cinygmula*	21	5.43
I205	*Epeorus albertae*	42	10.85
I215	*Epeorus longimanus*	19	4.91
I220	*Epeorus grandis*	2	0.52
I420	*Rhithrogena*	2	0.52
I900	*Ameletus*	2	0.52
	TOTAL: EPHEMEROPTERA	163	42.12
J020	Capniidae	1	0.26
J945	*Visoka cataractae*	1	0.26
J956	*Zapada cinctipes*	1	0.26
J959	*Zapada columbiana*	17	4.39
J977	*Zapada Oregonensis Gr.*	4	1.03
K130	*Doroneuria*	4	1.03
K450	*Isoperla*	1	0.26
K520	*Kogotus*	2	0.52
K550	*Megarcys*	6	1.55
K785	*Yoraperla*	2	0.52
	TOTAL: PLECOPTERA	39	10.08
N050	*Arctopsyche grandis*	1	0.26
N089	*Parapsyche elsis*	25	6.46
N210	*Micrasema*	18	4.65
O020	*Agraylea*	1	0.26
P622	*Rhyacophila Betteni Gr.*	1	0.26
P630	*Rhyacophila Brunnea Gr.*	7	1.81
P656	*Rhyacophila Hyalinata Gr.*	1	0.26
P662	*Rhyacophila Iranda Gr.*	2	0.52
P704	*Rhyacophila pellisa*	2	0.52
P746	*Rhyacophila Vemna Gr.*	2	0.52
P760	*Rhyacophial verrula*	1	0.26
	TOTAL: TRICOPTERA	61	15.76
S220	*Heterlimnius*	3	0.78
	TOTAL: COLEOPTERA	3	0.78

Seymour Creek, July 28, 1990 cont.

TAXACOD	Taxon	RA	%
V530	*Chelifera*	1	0.26
V560	*Clinocera*	1	0.26
W390	*Prosimulium*	6	1.55
X670	*Hexatoma*	1	0.26
	TOTAL: DIPTERA	9	2.33
Y400	*Conchapelopia/Thienemannimyia*	2	0.52
Y450	*Corynoneura*	2	0.52
Y520	*Cricotopus Nostococladius*	12	3.10
Y750	*Eukiefferiella*	26	6.72
Z095	*Micropsectra*	12	3.10
Z195	*Orthocladius*	2	0.52
Z230	*Pagastia*	4	1.03
Z250	*Parachironomus*	2	0.52
Z305	*Parametriocnemus*	6	1.55
Z315	*Paraphaenocladius*	2	0.52
Z515	*Rheocricotopus*	2	0.52
Z540	*Rheotanytarsus*	4	1.03
Z560	*Stempellina*	2	0.52
Z630	*Tanytarsus*	8	2.07
Z725	*Tvetenia*	16	4.13
	TOTAL: CHIRONOMIDAE	102	26.36
	GRAND TOTAL	387	100.00

Ephemerella infrequens type morph. present.
Epeorus longimanus present. Epeorus ?deceptivus also.

W.F. Stillwater River, RBP1D, Aug 21, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
File: 90S2F1DA A,B,C

TAXACOD	Taxon	RA	%
A150	Turbellaria	2	0.35
B000	Oligochaeta	9	1.58
	TOTAL: MISC. TAXA	11	1.93
H142	*Baetis tricaudatus*	37	6.50
H670	*Caudatella hystrix*	4	0.70
H705	*Drunella coloradensis*	17	2.99
H710	*Drunella doddsi*	41	7.21
H870	*Serratella tibialis*	8	1.41
I150	*Cinygmula*	104	18.28
I200	*Epeorus*	28	4.92
I205	*Epeorus albertae*	197	34.62
I420	*Rhithrogena*	41	7.21
I900	*Ameletus*	1	0.18
	TOTAL: EPHEMEROPTERA	478	84.01
J956	*Zapada cinctipes*	2	0.35
J959	*Zapada columbiana*	2	0.35
J977	*Zapada Oregonensis Gr.*	8	1.41
K113	*Calineuria californica*	6	1.05
K130	*Doroneuria*	1	0.18
K200	*Hesperoperla pacifica*	1	0.18
K300	Perlodidae	1	0.18
K550	*Megarcys*	1	0.18
	TOTAL: PLECOPTERA	22	3.87
N089	*Parapsyche elsis*	2	0.35
N160	*Brachycentrus americanus*	1	0.18
P180	*Dolophilodes*	1	0.18
P600	*Rhyacophila*	1	0.18
P622	*Rhyacophila Betteni Gr.*	1	0.18
P630	*Rhyacophila Brunnea Gr.*	13	2.28
P638	*Rhyacophila Coloradensis Gr.*	1	0.18
P686	*Rhyacophila narvae*	1	0.18
	TOTAL: TRICHOPTERA	21	3.69
S220	*Heterlimnius*	2	0.35
	TOTAL: COLEOPTERA	2	0.35
X670	*Hexatoma*	3	0.53
	TOTAL: DIPTERA	3	0.53
Y001	Chironomidae-pupae	4	0.70
Y150	*Brillia*	2	0.35
Y750	*Eukiefferiella*	12	2.11
Z095	*Micropsectra*	2	0.35
Z230	*Pagastia*	2	0.35
Z725	*Tvetenia*	10	1.76
	TOTAL: CHIRONOMIDAE	32	5.62
	GRAND TOTAL	569	100.00

W.F. Stillwater River, RBP2U, Aug.21, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
File: 90STI2FA A,B,C

TAXACODE	Taxon	RA	%
A150	Turbellaria	1	0.32
B000	Oligochaeta	1	0.32
	TOTAL: MISC. TAXA	2	0.63
H024	*Acentrella*	2	0.63
H142	*Baetis tricaudatus*	31	9.81
H705	*Drunella coloradensis*	10	3.16
H710	*Drunella doddsi*	15	4.75
H870	*Serratella tibialis*	10	3.16
I150	*Cinygmula*	75	23.73
I200	*Epeorus*	3	0.95
I205	*Epeorus albertae*	77	24.37
I420	*Rhithrogena*	13	4.11
I900	*Ameletus*	1	0.32
	TOTAL: EPHEMEROPTERA	237	75.00
J470	*Sweltsa*	3	0.95
J959	*Zapada columbiana*	1	0.32
J977	*Zapada Oregonensis Gr.*	5	1.58
K113	*Calineuria californica*	2	0.63
K550	*Megarcys*	3	0.95
K900	Taeniopterygidae	1	0.32
	TOTAL: PLECOPTERA	15	4.75
N050	*Arctopsyche grandis*	1	0.32
N160	*Brachycentrus americanus*	1	0.32
N800	*Hydropsyche*	1	0.32
P180	*Dolophilodes*	3	0.95
P622	*Rhyacophila Betteni Gr.*	1	0.32
P656	*Rhyacophila Hyalinata Gr.*	1	0.32
P686	*Rhyacophila narvae*	1	0.32
P910	*Neothremma*	1	0.32
	TOTAL: TRICHOPTERA	10	3.16
S225	*Heterlimnius corpulentus*	2	0.63
	TOTAL: COLEOPTERA	2	0.63
U450	Ceratopogonidae	2	0.63
W300	Simuliidae	1	0.32
X670	*Hexatoma*	8	2.53
X680	*Hesperoconopa*	1	0.32
	TOTAL: DIPTERA	12	3.80
Y001	Chironomidae-pupae	6	1.90
Y150	*Brillia*	2	0.63
Y750	*Eukiefferiella*	6	1.90
Z095	*Micropsectra*	6	1.90
Z195	*Orthocladius*	4	1.27
Z230	*Pagastia*	2	0.63
Z725	*Tvetenia*	12	3.80
	TOTAL: CHIRONOMIDAE	38	12.03
	GRAND TOTAL	316	100.00

Stoney Creek, August 30, 1990

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
A150	Turbellaria	8	1.69
B000	Oligochaeta	1	0.21
E300	Ostracoda	1	0.21
	TOTAL: MISC. TAXA	10	2.11
H070	*Baetis bicaudatus*	1	0.21
H142	*Baetis tricaudatus*	12	2.53
H705	*Drunella coloradensis*	8	1.69
H710	*Drunella doddsi*	18	3.80
H725	*Drunella spinifera*	7	1.48
I150	*Cinygmula*	31	6.54
I205	*Epeorus albertae*	53	11.18
I215	*Epeorus longimanus*	1	0.21
I220	*Epeorus grandis*	52	10.97
I420	*Rhithrogena*	42	8.86
I900	*Ameletus*	4	0.84
	TOTAL: EPHEMEROPTERA	229	48.31
J020	Capniidae	1	0.21
J470	*Sweltsa*	8	1.69
J550	Leuctridae	1	0.21
J945	*Visoka cataractae*	2	0.42
J959	*Zapada columbiana*	32	6.75
J977	*Zapada Oregonensis Gr.*	8	1.69
K130	*Doroneuria*	1	0.21
K300	Perlodidae	1	0.21
K550	*Megarcys*	6	1.27
K660	*Setvena*	3	0.63
K785	*Yoraperla*	46	9.70
K900	Taeniopterygidae	1	0.21
	TOTAL: PLECOPTERA	110	23.21
N089	*Parapsyche elsis*	14	2.95
N450	*Glossosoma*	7	1.48
O700	*Limnephilidae*	4	0.84
O760	*Chyranda centralis*	1	0.21
O798	*Dicosmoecus atripes*	1	0.21
O805	*Ecclisomyia*	19	4.01
P622	*Rhyacophila Betteni Gr.*	2	0.42
P630	*Rhyacophila Brunnea Gr.*	8	1.69
P656	*Rhyacophila Hyalinata Gr.*	3	0.63
P662	*Rhyacophila Iranda Gr.*	5	1.05
P686	*Rhyacophila narvae*	4	0.84
	TOTAL: TRICOPTERA	68	14.35
S220	*Heterlimnius*	6	1.27
	TOTAL: COLEOPTERA	6	1.27
V530	*Chelifera*	1	0.21
W390	*Prosimulium*	1	0.21
	TOTAL: DIPTERA	2	0.42

Stoney Creek, August 30, 1990 cont.

TAXACODE	Taxon	RA	%
Y150	*Brillia*	1	0.21
Y520	*Cricotopus Nostococladius*	27	5.70
Y750	*Eukiefferiella*	1	0.21
Z095	*Micropsectra*	5	1.05
Z230	*Pagastia*	3	0.63
Z515	*Rheocricotopus*	2	0.42
Z565	*Stempellinella*	3	0.63
Z685	*Thienemanniella*	1	0.21
Z725	*Tvetenia*	6	1.27
	TOTAL: CHIRONOMIDAE	49	10.34
	GRAND TOTAL	474	100.00

S.F. Sun River, Sept 12, 1990

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
File: 90SUNFA A,B,C

TAXACODE	Taxon	RA	%
A300	Nematoda	2	0.22
	TOTAL: MISC. TAXA	2	0.22
H142	*Baetis tricaudatus*	34	3.71
H670	*Caudatella hystrix*	8	0.87
H710	*Drunella doddsi*	212	23.14
H715	*Drunella grandis*	30	3.28
H765	*Ephemerella inermis*	20	2.18
I205	*Epeorus albertae*	22	2.40
I215	*Epeorus longimanus*	44	4.80
I420	*Rhithrogena*	166	18.12
I600	*Paraleptophlebia*	2	0.22
	TOTAL: EPHEMEROPTERA	538	58.73
J470	*Sweltsa*	2	0.22
J959	*Zapada columbiana*	6	0.66
J977	*Zapada Oregonensis Gr.*	44	4.80
K300	Perlodidae	12	1.31
K450	*Isoperla*	10	1.09
K550	*Megarcys*	14	1.53
K670	*Skwala*	6	0.66
	TOTAL: PLECOPTERA	94	10.26
N050	*Arctopsyche grandis*	14	1.53
N089	*Parapsyche elsis*	2	0.22
N160	*Brachycentrus americanus*	30	3.28
N210	*Micrasema*	6	0.66
N450	*Glossosoma*	2	0.22
P600	*Rhyacophila*	22	2.40
P622	*Rhyacophila Betteni Gr.*	10	1.09
P630	*Rhyacophila Brunnea Gr.*	32	3.49
P656	*Rhyacophila Hyalinata Gr.*	8	0.87
P662	*Rhyacophila Iranda Gr.*	2	0.22
P940	*Oligophlebodes*	2	0.22
	TOTAL: TRICHOPTERA	130	14.19
S220	Heterlimnius	8	0.87
	TOTAL: COLEOPTERA	8	0.87
U300	Blephariceridae	4	0.44
V500	Empididae	2	0.22
V560	*Clinocera*	2	0.22
W300	Simuliidae	2	0.22
X670	*Hexatoma*	10	1.09
	TOTAL: DIPTERA	20	2.18

S.F. Sun River, Sept 12, 1990 cont.

TAXACODE	Taxon	RA	%
Y001	Chironomidae-pupae	2	0.22
Y460	*Cricotopus*	20	2.18
Y520	*Cricotopus Nostococladius*	22	2.40
Y750	*Eukiefferiella*	16	1.75
Y950	*Hydrobaenus*	4	0.44
Z095	*Micropsectra*	8	0.87
Z195	*Orthocladius*	28	3.06
Z230	*Pagastia*	8	0.87
Z585	*Sublettea*	16	1.75
	TOTAL: CHIRONOMIDAE	124	13.54
	GRAND TOTAL	916	100.00

Tenderfoot Creek, Sept. 6, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
H142	*Baetis tricaudatus*	32	2.70
H670	*Caudatella hystrix*	4	0.34
H710	*Drunella doddsi*	12	1.01
H715	*Drunella grandis*	36	3.04
H765	*Ephemerella inermis*	12	1.01
I150	*Cinygmula*	4	0.34
I200	*Epeorus*	4	0.34
I900	*Ameletus*	4	0.34
	TOTAL: EPHEMEROPTERA	108	9.12
J956	*Zapada cinctipes*	12	1.01
K125	*Claassenia sabulosa*	8	0.68
K200	*Hesperoperla pacifica*	4	0.34
	TOTAL: PLECOPTERA	24	2.03
N050	*Arctopsyche grandis*	32	2.70
N160	*Brachycentrus americanus*	272	22.97
N210	*Micrasema*	4	0.34
N450	*Glossosoma*	108	9.12
N800	*Hydropsyche*	40	3.38
O482	Lepidostoma-sand case larvae	44	3.72
O730	*Apatania*	44	3.72
P630	*Rhyacophila Brunnea Gr.*	36	3.04
P638	*Rhyacophila Coloradensis Gr.*	12	1.01
	TOTAL: TRICOPTERA	592	50.00
S320	*Optioservus*	104	8.78
S450	*Zaitzevia parvula*	24	2.03
	TOTAL: COLEOPTERA	128	10.81
X560	*Antocha*	44	3.72
	TOTAL: DIPTERA	44	3.72
Y460	*Cricotopus*	8	0.68
Y520	*Cricotopus Nostococladius*	76	6.42
Y620	*Diamesa*	8	0.68
Y750	*Eukiefferiella*	24	2.03
Z195	*Orthocladius*	152	12.84
Z230	*Pagastia*	4	0.34
Z565	*Stempellinella*	4	0.34
Z585	*Sublettea*	4	0.34
Z600	*Sympotthastia*	8	0.68
	TOTAL: CHIRONOMIDAE	288	24.32
	GRAND TOTAL	1184	100.00

Optioservus quadrimaculatus

N.F. Teton River, Sept. 11, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
H142	*Baetis tricaudatus*	45	8.62
H705	*Drunella coloradensis*	6	1.15
H710	*Drunella doddsi*	44	8.43
H715	*Drunella grandis*	12	2.30
I150	*Cinygmula*	15	2.87
I205	*Epeorus albertae*	30	5.75
I215	*Epeorus longimanus*	2	0.38
I220	*Epeorus grandis*	16	3.07
I420	*Rhithrogena*	231	44.25
	TOTAL: EPHEMEROPTERA	401	76.82
J020	Capniidae	1	0.19
J470	*Sweltsa*	6	1.15
J550	Leuctridae	1	0.19
J956	*Zapada cinctipes*	1	0.19
J959	*Zapada columbiana*	28	5.36
J977	*Zapada Oregonensis Gr.*	49	9.39
K550	*Megarcys*	14	2.68
	TOTAL: PLECOPTERA	100	19.16
N089	*Parapsyche elsis*	3	0.57
O730	*Apatania*	1	0.19
P622	*Rhyacophila Betteni Gr.*	10	1.92
P630	*Rhyacophila Brunnea Gr.*	1	0.19
P656	*Rhyacophila Hyalinata Gr.*	2	0.38
	TOTAL: TRICOPTERA	17	3.26
U320	*Bibiocephala*	1	0.19
W390	*Prosimulium*	1	0.19
	TOTAL: DIPTERA	2	0.38
Y150	*Brillia*	1	0.19
Y750	*Eukiefferiella*	1	0.19
	TOTAL: CHIRONOMIDAE	2	0.38
	GRAND TOTAL	522	100.00

Tongue River near Pyramid Butte, July 19, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
A150	Turbellaria	124	5.22
B000	Oligochaeta	56	2.36
C010	Hirudinea	8	0.34
D670	*Physella*	32	1.35
E660	*Hyallela azteca*	4	0.17
	TOTAL: MISC. TAXA	224	9.43
H020	Baetidae	544	22.90
H760	*Ephemerella aurivillii*	16	0.67
I420	*Rhithrogena*	4	0.17
I470	*Stenonema*	4	0.17
I500	Leptophlebiidae	364	15.32
I990	*Tricorythodes minutus*	52	2.19
	TOTAL: EPHEMEROPTERA	984	41.41
L585	*Ambrysus*	120	5.05
	TOTAL: HEMIPTERA	120	5.05
N575	*Helicopsyche borealis*	24	1.01
O000	Hydroptilidae	4	0.17
O070	*Hydroptila*	20	0.84
O120	*Ithytrichia*	4	0.17
O180	*Mayatrichia*	4	0.17
O250	*Ochrotrichia*	12	0.51
	TOTAL: TRICOPTERA	68	2.86
S170	*Dubiraphia*	12	0.51
S390	*Stenelmis*	792	33.33
	TOTAL: COLEOPTERA	804	33.84
U450	Ceratopogonidae	20	0.84
W390	*Prosimulium*	8	0.34
W450	*Simulium*	72	3.03
	TOTAL: DIPTERA	100	4.21
Y460	*Cricotopus*	52	2.19
Y750	*Eukiefferiella*	4	0.17
Z395	*Potthastia*	4	0.17
Z515	*Rheocricotopus*	16	0.67
	TOTAL: CHIRONOMIDAE	76	3.20
	GRAND TOTAL	2376	100.00

Sample poorly preserved. Many fragile taxa fragmented.
Possibly Chloroterpes annulata (Bukantis I.D.) present, but specimens were too fragmented to be sure.
Stenelmis spp. present.

Tule Creek at Hwy.13, RBP 05-1, August 23, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
A110	*Hydra*	4	0.26
B000	Oligochaeta	96	6.33
D670	*Physella*	220	14.51
D700	*Gyraulus*	4	0.26
E100	Cladocera	40	2.64
E300	Ostracoda	4	0.26
E550	Gammarus	176	11.61
E660	*Hyallela azteca*	240	15.83
	TOTAL: MISC. TAXA	784	51.72
G600	Coenagrionidae	184	12.14
	TOTAL: ODONATA	184	12.14
H180	*Callibaetis*	80	5.28
H490	*Caenis*	20	1.32
I500	Leptophlebiidae	4	0.26
I990	*Tricorythodes minutus*	4	0.26
	TOTAL: EPHEMEROPTERA	108	7.12
L100	Corixidae	40	2.64
L360	*Gerris*	28	1.85
	TOTAL: HEMIPTERA	68	4.49
R200	Dytiscidae	8	0.53
S620	*Haliplus*	92	6.07
	TOTAL: COLEOPTERA	100	6.60
V000	Culicidae	4	0.26
	TOTAL: DIPTERA	4	0.26
Y010	*Acricotopus*	16	1.06
Y240	*Chaetocladius*	16	1.06
Y470	*Cricotopus cricotopus*	8	0.53
Y630	*Dicrotendipes*	156	10.29
Y860	*Glyptotendipes*	16	1.06
Z095	*Micropsectra*	40	2.64
Z120	*Nanocladius*	4	0.26
Z320	*Paratanytarsus*	12	0.79
	TOTAL: CHIRONOMIDAE	268	17.68
	GRAND TOTAL	1516	100.00

Gammarus lacustris, Physella gyrina ?subsp., Nais variablis
Chaetogaster diaphanus, Caenis cf. latipennis, Caenis youngi
Sigara, Agabus

Tule Creek at Hwy. 13, Veg. Sample, August 23, 1990

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
A110	Hydra	4	0.25
B000	Oligochaeta	656	40.39
D670	*Physella*	64	3.94
D700	*Gyraulus*	32	1.97
E100	Cladocera	12	0.74
E200	Copepoda	4	0.25
E300	Ostracoda	76	4.68
E660	*Hyallela azteca*	260	16.01
F000	Acari	4	0.25
	TOTAL: MISC. TAXA	1112	68.47
G600	Coenagrionidae	60	3.69
	TOTAL: ODONATA	60	3.69
H180	*Callibaetis*	24	1.48
H490	*Caenis*	4	0.25
	TOTAL: EPHEMEROPTERA	28	1.72
R200	Dytiscidae	8	0.49
S620	*Haliplus*	56	3.45
	TOTAL: COLEOPTERA	64	3.94
U450	Ceratopogonidae	48	2.96
	TOTAL: DIPTERA	48	2.96
Y450	*Corynoneura*	4	0.25
Y460	*Cricotopus*	24	1.48
Y630	*Dicrotendipes*	68	4.19
Z095	*Micropsectra*	4	0.25
Z195	*Orthocladius*	12	0.74
Z320	*Paratanytarsus*	28	1.72
Z440	*Psectrocladius*	80	4.93
Z480	*Pseudochironomus*	88	5.42
Z725	*Tvetenia*	4	0.25
	TOTAL: CHIRONOMIDAE	312	19.21
	GRAND TOTAL	1624	100.00

see taxa annotations for other sample

Waldron Creek, Sept. 11, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
A150	Turbellaria	34	4.11
A300	Nematoda	2	0.24
B000	Oligochaeta	4	0.48
	TOTAL: MISC. TAXA	40	4.83
H142	*Baetis tricaudatus*	130	15.70
H710	*Drunella doddsi*	134	16.18
I150	*Cinygmula*	2	0.24
I205	*Epeorus albertae*	4	0.48
I220	*Epeorus grandis*	18	2.17
I420	*Rhithrogena*	40	4.83
I900	*Ameletus*	6	0.72
	TOTAL: EPHEMEROPTERA	334	40.34
J470	*Sweltsa*	2	0.24
J959	*Zapada columbiana*	94	11.35
J977	*Zapada Oregonensis Gr.*	12	1.45
K000	Perlidae	2	0.24
K450	*Isoperla*	2	0.24
K550	*Megarcys*	54	6.52
K660	*Setvena*	4	0.48
K785	*Yoraperla*	172	20.77
K900	Taeniopterygidae	4	0.48
	TOTAL: PLECOPTERA	346	41.79
N089	*Parapsyche elsis*	16	1.93
N450	*Glossosoma*	6	0.72
O760	*Chyranda centralis*	4	0.48
O845	*Homophylax*	2	0.24
P622	*Rhyacophila Betteni Gr.*	8	0.97
P656	*Rhyacophila Hyalinata Gr.*	20	2.42
P662	*Rhyacophila Iranda Gr.*	6	0.72
P704	*Rhyacophila pellisa*	2	0.24
	TOTAL: TRICOPTERA	64	7.73
V530	*Chelifera*	2	0.24
V655	*Oreogeton*	22	2.66
V950	Pelecorhynchidae	6	0.72
	TOTAL: DIPTERA	30	3.62
Y750	*Eukiefferiella*	8	0.97
Z195	*Orthocladius*	6	0.72
	TOTAL: CHIRONOMIDAE	14	1.69
	GRAND TOTAL	828	100.00

Willow Creek at Hwy. 2, RBP#1, August 20, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
D580	*Stagnicola*	16	0.13
D670	*Physella*	232	1.87
D700	*Gyraulus*	384	3.10
E100	Cladocera	1664	13.44
E200	Copepoda	96	0.78
E300	Ostracoda	32	0.26
E660	*Hyallela azteca*	5192	41.94
	TOTAL: MISC. TAXA	7616	61.52
G300	Libellulidae	8	0.06
G600	Coenagrionidae	112	0.90
	TOTAL: ODONATA	120	0.97
H180	*Callibaetis*	80	0.65
H490	*Caenis*	2192	17.71
	TOTAL: EPHEMEROPTERA	2272	18.35
L100	Corixidae	128	1.03
	TOTAL: HEMIPTERA	128	1.03
N690	*Cheumatopsyche*	56	0.45
O070	*Hydroptila*	160	1.29
O630	*Oecetis*	8	0.06
	TOTAL: TRICOPTERA	224	1.81
R200	Dytiscidae	32	0.26
S620	*Haliplus*	8	0.06
	TOTAL: COLEOPTERA	40	0.32
U450	Ceratopogonidae	72	0.58
V860	*Limnophora*	8	0.06
W450	*Simulium*	72	0.58
X550	Tipulidae	8	0.06
	TOTAL: DIPTERA	160	1.29
Y020	*Ablabesmyia*	170	1.37
Y310	*Chironomus*	34	0.27
Y400	*Conchapelopia/Thienemannimyia*	102	0.82
Y460	*Cricotopus*	323	2.61
Y580	*Cryptochironomus*	68	0.55
Y630	*Dicrotendipes*	136	1.10
Y710	*Endochironomus*	17	0.14
Z095	*Micropsectra*	34	0.27
Z195	*Orthocladius*	17	0.14
Z250	*Parachironomus*	17	0.14
Z320	*Paratanytarsus*	765	6.18
Z375	*Polypedilum*	17	0.14
Z470	*Psectrotanypus*	17	0.14
Z630	*Tanytarsus*	102	0.82
	TOTAL: CHIRONOMIDAE	1819	14.69
	GRAND TOTAL	12379	100.00

Physella propinqua nuttalli, Gyraulus parvus, Caenis cf. latipennis
?Ormosia (Tipulidae), Trichocorixa naias, Trichocorixa verticalis interiores
Sigara, Oreodytes, Coenagrion/Enallagma

Willow Creek at Hwy. 2, Veg. Sample, August 20, 199

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
D700	*Gyraulus*	40	0.72
E100	Cladocera	232	4.19
E200	Copepoda	292	5.27
E660	*Hyallela azteca*	1392	25.13
	TOTAL: MISC. TAXA	1956	35.31
G600	Coenagrionidae	8	0.14
	TOTAL: ODONATA	8	0.14
H490	*Caenis*	328	5.92
	TOTAL: EPHEMEROPTERA	328	5.92
L100	Corixidae	4	0.07
	TOTAL: HEMIPTERA	4	0.07
O070	*Hydroptila*	24	0.43
	TOTAL: TRICOPTERA	24	0.43
T000	Hydrophilidae	4	0.07
	TOTAL: COLEOPTERA	4	0.07
U450	Ceratopogonidae	12	0.22
V860	*Limnophora*	16	0.29
	TOTAL: DIPTERA	28	0.51
Y310	*Chironomus*	33	0.60
Y400	*Conchapelopia/Thienemannimyia*	1040	18.77
Y460	*Cricotopus*	260	4.69
Y630	*Dicrotendipes*	163	2.94
Z095	*Micropsectra*	98	1.77
Z195	*Orthocladius*	293	5.29
Z320	*Paratanytarsus*	748	13.50
Z360	*Pentaneura*	65	1.17
Z440	*Psectrocladius*	33	0.60
Z630	*Tanytarsus*	390	7.04
Z770	*Zavrelimyia*	65	1.17
	TOTAL: CHIRONOMIDAE	3188	57.55
	GRAND TOTAL	5540	100.00

see taxa annotations for other sample

Wisconson Creek, August 4, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
Aquatic Biology Associates, Corvallis, Oregon, (503) 752-1568.

TAXACODE	Taxon	RA	%
A150	Turbellaria	28	3.31
A300	Nematoda	2	0.24
B000	Oligochaeta	4	0.47
E300	Ostracoda	6	0.71
F000	Acari	6	0.71
	TOTAL: MISC. TAXA	46	5.44
H870	*Serratella tibialis*	2	0.24
I050	*Cinygma*	22	2.60
I150	*Cinygmula*	12	1.42
I600	*Paraleptophlebia*	4	0.47
I900	*Ameletus*	76	8.98
	TOTAL: EPHEMEROPTERA	116	13.71
J470	*Sweltsa*	8	0.95
J945	*Visoka cataractae*	6	0.71
J959	*Zapada columbiana*	138	16.31
J977	*Zapada Oregonensis Gr.*	8	0.95
K450	*Isoperla*	8	0.95
K550	*Megarcys*	4	0.47
K660	*Setvena*	2	0.24
	TOTAL: PLECOPTERA	174	20.57
N089	*Parapsyche elsis*	4	0.47
N320	*Agapetus*	2	0.24
O780	*Cryptochia*	2	0.24
P662	*Rhyacophila Iranda Gr.*	24	2.84
P746	*Rhyacophila Vemna Gr.*	10	1.18
P915	*Neothremma alicia*	362	42.79
	TOTAL: TRICOPTERA	404	47.75
S220	*Heterlimnius*	2	0.24
S450	*Zaitzevia parvula*	2	0.24
	TOTAL: COLEOPTERA	4	0.47
V530	*Chelifera*	6	0.71
W390	*Prosimulium*	4	0.47
X670	*Hexatoma*	2	0.24
X790	*Pedicia*	2	0.24
X870	*Tipula*	12	1.42
	TOTAL: DIPTERA	26	3.07
Y520	*Cricotopus Nostococladius*	16	1.89
Y750	*Eukiefferiella*	4	0.47
Z095	*Micropsectra*	44	5.20
Z515	*Rheocricotopus*	4	0.47
Z565	*Stempellinella*	4	0.47
Z725	*Tvetenia*	4	0.47
	TOTAL: CHIRONOMIDAE	76	8.98
	GRAND TOTAL	846	100.00

DUAL SITE COMPARISONS

Modified Rapid Bioassessment Protocol III

File: CVDUAL

The following data summaries provide a comparison between a "reference community" and a comparison site of interest (see Plafkin et al. 1989). Reference communities may be:

1. An upstream "control" station that is similar in habitat characteristics to a downstream, potentially impacted, station of interest.

2. A near by "control" stream that is similar in habitat characteristics to a potentially impacted stream of interest.

3. A composite community profile of several relatively unimpacted streams from a particular region.

The dual site Fortran program (DS21) computes a variety of community similarity and comparison statistics.

The Community Loss Index, Jaccard Coefficient of Community Similarity, and Pinkham and Pearson Community Similarity Index are discussed by Plafkin et al. (1989). The Common Taxa Index, Quantitative Similarity Index, Quantitative Similarity Index (Feeding Groups), and Dominants in Common are metrics discussed by Shackleford (1988). The QSI (Taxa) and QSI (Feeding Groups) are expressed on a scale of 0-1 here.

Each dual site comparison is stored in a separate file. These are Word Perfect 5.1 files.

```
                    METRIC SUMMARY: DUAL SITE COMPARISON

 REFERENCE SITE:
Montana: Montane Reference Community-1990 Version.

 COMPARISON SITE:
Big Creek, July 26, 1990.

REFERENCE SITE:                   COMPARISON SITE:
Total abundance    =    501.     Total abundance    =    285.
Total number taxa =      34.     Total number taxa =      29.
Number EPT taxa    =     26.     Number EPT taxa    =     20.

Total taxa in common =    18.
EPT taxa in common   =    12.

Community loss index  =    .552
Jaccard similarity    =    .400
Common taxa index     =    .529
Pinkham-Pearson similarity index (B2): SI        =    .018
Quantitative similarity index                    =    .437
Quantitative similarity index (Feeding groups) =    .713

DOMINANT TAXA:
 REFERENCE SITE                   COMPARISON SITE
 1 Baetis tricaudatus              Baetis tricaudatus
 2 Rhithrogena                     Cinygmula
 3 Drunella doddsi                 Serratella tibialis
 4 Epeorus albertae                Epeorus albertae
 5 Cinygmula                       Drunella coloradensis
 6 Epeorus grandis                 Orthocladius
 7 Glossosoma                      Ameletus
 8 Megarcys                        Eukiefferiella
 9 Yoraperla                       Epeorus longimanus
10 Brachycentrus americanus        Glossosoma

DOMINANTS IN COMMON
Among 5 most abundant  =  3.
Among 10 most abundant =  4.
```

```
                    METRIC SUMMARY: DUAL SITE COMPARISON

 REFERENCE SITE:
Montana: Montane Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III.  Riffle samples.
Mean abundances of 34 most numerous taxa.
File: MONTANEA

 COMPARISON SITE:
Boulder Creek, August 23, 1990.


REFERENCE SITE:                 COMPARISON SITE:
Total abundance    =    501.    Total abundance    =    582.
Total number taxa =      34.    Total number taxa =      30.
Number EPT taxa    =     26.    Number EPT taxa    =     23.

Total taxa in common =    20.
EPT taxa in common   =    15.

Community loss index  =    .467
Jaccard similarity    =    .455
Common taxa index     =    .588
Pinkham-Pearson similarity index (B2): SI       =    .016
Quantitative similarity index                   =    .568
Quantitative similarity index (Feeding groups) =    .836

DOMINANT TAXA:
 REFERENCE SITE                  COMPARISON SITE
 1 Baetis tricaudatus             Epeorus albertae
 2 Rhithrogena                    Baetis tricaudatus
 3 Drunella doddsi                Rhithrogena
 4 Epeorus albertae               Cinygmula
 5 Cinygmula                      Epeorus longimanus
 6 Epeorus grandis                Drunella coloradensis
 7 Glossosoma                     Megarcys
 8 Megarcys                       Drunella doddsi
 9 Yoraperla                      Serratella tibialis
10 Brachycentrus americanus       Zapada Oregonensis Gr.

DOMINANTS IN COMMON
Among 5 most abundant  =  4.
Among 10 most abundant =  6.
```

```
                    METRIC SUMMARY: DUAL SITE COMPARISON

 REFERENCE SITE:
Montana: Montane Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III.  Riffle samples.
Mean abundances of 34 most numerous taxa.
File: MONTANEA

 COMPARISON SITE:
East Fork Bull River, Sept. 2, 1990.


REFERENCE SITE:                 COMPARISON SITE:
Total abundance    =    501.    Total abundance    =    384.
Total number taxa =      34.    Total number taxa =      27.
Number EPT taxa    =     26.    Number EPT taxa    =     20.

Total taxa in common =    17.
EPT taxa in common   =    13.

Community loss index  =    .630
Jaccard similarity    =    .386
Common taxa index     =    .500
Pinkham-Pearson similarity index (B2): SI       =    .020
Quantitative similarity index                   =    .546
Quantitative similarity index (Feeding groups) =    .828

DOMINANT TAXA:
 REFERENCE SITE                  COMPARISON SITE
 1 Baetis tricaudatus             Rhithrogena
 2 Rhithrogena                    Epeorus grandis
 3 Drunella doddsi                Drunella doddsi
 4 Epeorus albertae               Baetis tricaudatus
 5 Cinygmula                      Epeorus albertae
 6 Epeorus grandis                Parapsyche elsis
 7 Glossosoma                     Zapada columbiana
 8 Megarcys                       Tvetenia
 9 Yoraperla                      Rhyacophila Hyalinata Gr.
10 Brachycentrus americanus       Cinygmula

DOMINANTS IN COMMON
Among 5 most abundant  =  4.
Among 10 most abundant =  6.
```

```
                    METRIC SUMMARY: DUAL SITE COMPARISON

 REFERENCE SITE:
Montana: Montane Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III.  Riffle samples.
Mean abundances of 34 most numerous taxa.
File: MONTANEA

 COMPARISON SITE:
Calf Creek, Sept 6, 1990.


REFERENCE SITE:                 COMPARISON SITE:
Total abundance    =    501.    Total abundance    =    456.
Total number taxa =      34.    Total number taxa =      44.
Number EPT taxa    =     26.    Number EPT taxa    =     25.

Total taxa in common =    18.
EPT taxa in common   =    11.

Community loss index  =    .364
Jaccard similarity    =    .300
Common taxa index     =    .409
Pinkham-Pearson similarity index (B2): SI       =    .004
Quantitative similarity index                   =    .262
Quantitative similarity index (Feeding groups) =    .745

DOMINANT TAXA:
 REFERENCE SITE                  COMPARISON SITE
 1 Baetis tricaudatus             Heterlimnius
 2 Rhithrogena                    Cinygmula
 3 Drunella doddsi                Optioservus
 4 Epeorus albertae               Zapada cinctipes
 5 Cinygmula                      Drunella grandis
 6 Epeorus grandis                Baetis
 7 Glossosoma                     Skwala
 8 Megarcys                       Rhyacophila Brunnea Gr.
 9 Yoraperla                      Paraleptophlebia
10 Brachycentrus americanus       Antocha

DOMINANTS IN COMMON
Among 5 most abundant  =  1.
Among 10 most abundant =  1.
```

METRIC SUMMARY: DUAL SITE COMPARISON

REFERENCE SITE:
Montana: Montane Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III. Riffle samples.
Mean abundances of 34 most numerous taxa.
File: MONTANEA

COMPARISON SITE:
Crooked River above Tillett Ranch, #1, July 10, 1990.

REFERENCE SITE:		COMPARISON SITE:	
Total abundance =	501.	Total abundance =	306.
Total number taxa =	34.	Total number taxa =	17.
Number EPT taxa =	26.	Number EPT taxa =	13.

Total taxa in common = 12.
EPT taxa in common = 9.

Community loss index = 1.294
Jaccard similarity = .308
Common taxa index = .353
Pinkham-Pearson similarity index (B2): SI = .013
Quantitative similarity index = .313
Quantitative similarity index (Feeding groups) = .608

DOMINANT TAXA:

	REFERENCE SITE	COMPARISON SITE
1	Baetis tricaudatus	Baetis tricaudatus
2	Rhithrogena	Cinygmula
3	Drunella doddsi	Epeorus longimanus
4	Epeorus albertae	Serratella tibialis
5	Cinygmula	Rhyacophila Brunnea Gr.
6	Epeorus grandis	Diphetor hageni
7	Glossosoma	Brachycentrus americanus
8	Megarcys	Ameletus
9	Yoraperla	Hydropsyche
10	Brachycentrus americanus	Oligochaeta

DOMINANTS IN COMMON
Among 5 most abundant = 2.
Among 10 most abundant = 3.

METRIC SUMMARY: DUAL SITE COMPARISON

REFERENCE SITE:
Montana: Montane Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III. Riffle samples.
Mean abundances of 34 most numerous taxa.
File: MONTANEA

COMPARISON SITE:
Crooked River above Tillett Ranch, #2, July 10, 1990.

REFERENCE SITE:		COMPARISON SITE:	
Total abundance =	501.	Total abundance =	352.
Total number taxa =	34.	Total number taxa =	26.
Number EPT taxa =	26.	Number EPT taxa =	16.

Total taxa in common = 14.
EPT taxa in common = 9.

Community loss index = .769
Jaccard similarity = .304
Common taxa index = .412
Pinkham-Pearson similarity index (B2): SI = .011
Quantitative similarity index = .308
Quantitative similarity index (Feeding groups) = .566

DOMINANT TAXA:

	REFERENCE SITE	COMPARISON SITE
1	Baetis tricaudatus	Baetis tricaudatus
2	Rhithrogena	Serratella tibialis
3	Drunella doddsi	Epeorus longimanus
4	Epeorus albertae	Cinygmula
5	Cinygmula	Eukiefferiella
6	Epeorus grandis	Orthocladius
7	Glossosoma	Brachycentrus occidentalis
8	Megarcys	Rhyacophila Brunnea Gr.
9	Yoraperla	Simulium
10	Brachycentrus americanus	Oligochaeta

DOMINANTS IN COMMON
Among 5 most abundant = 2.
Among 10 most abundant = 2.

METRIC SUMMARY: DUAL SITE COMPARISON

REFERENCE SITE:
Montana: Montane Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III. Riffle samples.
Mean abundances of 34 most numerous taxa.
File: MONTANEA

COMPARISON SITE:
S.F.Flathead R. above Bunker Cr., August 31, 1990.

REFERENCE SITE:		COMPARISON SITE:	
Total abundance =	501.	Total abundance =	199.
Total number taxa =	34.	Total number taxa =	14.
Number EPT taxa =	26.	Number EPT taxa =	11.

Total taxa in common = 11.
EPT taxa in common = 9.

Community loss index = 1.643
Jaccard similarity = .297
Common taxa index = .324
Pinkham-Pearson similarity index (B2): SI = .019
Quantitative similarity index = .414
Quantitative similarity index (Feeding groups) = .820

DOMINANT TAXA:

	REFERENCE SITE	COMPARISON SITE
1	Baetis tricaudatus	Epeorus albertae
2	Rhithrogena	Drunella doddsi
3	Drunella doddsi	Rhithrogena
4	Epeorus albertae	Baetis tricaudatus
5	Cinygmula	Arctopsyche grandis
6	Epeorus grandis	Serratella tibialis
7	Glossosoma	Claassenia sabulosa
8	Megarcys	Cinygmula
9	Yoraperla	Epeorus longimanus
10	Brachycentrus americanus	Hesperoperla pacifica

DOMINANTS IN COMMON
Among 5 most abundant = 4.
Among 10 most abundant = 5.

METRIC SUMMARY: DUAL SITE COMPARISON

REFERENCE SITE:
Montana: Montane Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III. Riffle samples.
Mean abundances of 34 most numerous taxa.
File: MONTANEA

COMPARISON SITE:
Four Mile Creek, Sept 13, 1990.

REFERENCE SITE:		COMPARISON SITE:	
Total abundance =	501.	Total abundance =	555.
Total number taxa =	34.	Total number taxa =	45.
Number EPT taxa =	26.	Number EPT taxa =	30.

Total taxa in common = 21.
EPT taxa in common = 17.

Community loss index = .289
Jaccard similarity = .362
Common taxa index = .467
Pinkham-Pearson similarity index (B2): SI = .009
Quantitative similarity index = .407
Quantitative similarity index (Feeding groups) = .792

DOMINANT TAXA:

REFERENCE SITE	COMPARISON SITE
1 Baetis tricaudatus	Rhithrogena
2 Rhithrogena	Cinygmula
3 Drunella doddsi	Apatania
4 Epeorus albertae	Zapada Oregonensis Gr.
5 Cinygmula	Drunella doddsi
6 Epeorus grandis	Zapada columbiana
7 Glossosoma	Micrasema
8 Megarcys	Parapsyche elsis
9 Yoraperla	Turbellaria
10 Brachycentrus americanus	Doroneuria

DOMINANTS IN COMMON
Among 5 most abundant = 3.
Among 10 most abundant = 3.

```
                         METRIC SUMMARY: DUAL SITE COMPARISON

 REFERENCE SITE:
Montana: Montane Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III.  Riffle samples.
Mean abundances of 34 most numerous taxa.
File: MONTANEA

 COMPARISON SITE:
West Gallatin River, Sept. 4, 1990.


REFERENCE SITE:                COMPARISON SITE:
Total abundance    =    501.   Total abundance    =    820.
Total number taxa =      34.   Total number taxa =      26.
Number EPT taxa    =     26.   Number EPT taxa    =     15.

Total taxa in common =    12.
EPT taxa in common   =    10.

Community loss index  =    .846
Jaccard similarity    =    .250
Common taxa index     =    .353
Pinkham-Pearson similarity index (B2): SI       =    .007
Quantitative similarity index                   =    .314
Quantitative similarity index (Feeding groups) =    .759

DOMINANT TAXA:
 REFERENCE SITE                 COMPARISON SITE
 1 Baetis tricaudatus            Glossosoma
 2 Rhithrogena                   Brachycentrus occidentalis
 3 Drunella doddsi               Drunella doddsi
 4 Epeorus albertae              Baetis tricaudatus
 5 Cinygmula                     Hydropsyche
 6 Epeorus grandis               Atherix
 7 Glossosoma                    Hexatoma
 8 Megarcys                      Orthocladius
 9 Yoraperla                     Hesperoperla pacifica
10 Brachycentrus americanus      Arctopsyche grandis

DOMINANTS IN COMMON
Among 5 most abundant  =  2.
Among 10 most abundant =  3.
```

```
                        METRIC SUMMARY: DUAL SITE COMPARISON

 REFERENCE SITE:
Montana: Montane Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III.  Riffle samples.
Mean abundances of 34 most numerous taxa.
File: MONTANEA

 COMPARISON SITE:
Pine Creek, July 26, 1990.


REFERENCE SITE:                COMPARISON SITE:
Total abundance   =    501.    Total abundance   =    324.
Total number taxa =     34.    Total number taxa =     34.
Number EPT taxa   =     26.    Number EPT taxa   =     17.

Total taxa in common =    17.
EPT taxa in common   =    11.

Community loss index  =    .500
Jaccard similarity    =    .333
Common taxa index     =    .500
Pinkham-Pearson similarity index (B2): SI      =    .003
Quantitative similarity index                  =    .242
Quantitative similarity index (Feeding groups) =    .696

DOMINANT TAXA:
 REFERENCE SITE                  COMPARISON SITE
 1 Baetis tricaudatus             Yoraperla
 2 Rhithrogena                    Neothremma alicia
 3 Drunella doddsi                Turbellaria
 4 Epeorus albertae               Micropsectra
 5 Cinygmula                      Serratella tibialis
 6 Epeorus grandis                Micrasema
 7 Glossosoma                     Cinygma
 8 Megarcys                       Eukiefferiella
 9 Yoraperla                      Zapada columbiana
10 Brachycentrus americanus       Tvetenia

DOMINANTS IN COMMON
Among 5 most abundant  =  0.
Among 10 most abundant =  1.
```

METRIC SUMMARY: DUAL SITE COMPARISON

REFERENCE SITE:
Montana: Montane Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III. Riffle samples.
Mean abundances of 34 most numerous taxa.
File: MONTANEA

COMPARISON SITE:
Roaring Lion Creek, July 27, 1990.

REFERENCE SITE:		COMPARISON SITE:	
Total abundance =	501.	Total abundance =	912.
Total number taxa =	34.	Total number taxa =	37.
Number EPT taxa =	26.	Number EPT taxa =	22.

Total taxa in common = 20.
EPT taxa in common = 15.

Community loss index = .378
Jaccard similarity = .392
Common taxa index = .541
Pinkham-Pearson similarity index (B2): SI = .006
Quantitative similarity index = .373
Quantitative similarity index (Feeding groups) = .878

DOMINANT TAXA:

	REFERENCE SITE	COMPARISON SITE
1	Baetis tricaudatus	Epeorus grandis
2	Rhithrogena	Epeorus longimanus
3	Drunella doddsi	Micropsectra
4	Epeorus albertae	Baetis tricaudatus
5	Cinygmula	Serratella tibialis
6	Epeorus grandis	Zapada columbiana
7	Glossosoma	Dolophilodes
8	Megarcys	Orthocladius
9	Yoraperla	Eukiefferiella
10	Brachycentrus americanus	Brillia

DOMINANTS IN COMMON
Among 5 most abundant = 1.
Among 10 most abundant = 2.

```
                    METRIC SUMMARY: DUAL SITE COMPARISON

 REFERENCE SITE:
Montana: Montane Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III.  Riffle samples.
Mean abundances of 34 most numerous taxa.
File: MONTANEA

 COMPARISON SITE:
Lake Fork Rock Creek, August 22, 1990.


REFERENCE SITE:                COMPARISON SITE:
Total abundance    =    501.   Total abundance    =    580.
Total number taxa =      34.   Total number taxa =      32.
Number EPT taxa    =     26.   Number EPT taxa    =     18.

Total taxa in common =    17.
EPT taxa in common   =    13.

Community loss index  =    .531
Jaccard similarity    =    .347
Common taxa index     =    .500
Pinkham-Pearson similarity index (B2): SI       =    .009
Quantitative similarity index                   =    .397
Quantitative similarity index (Feeding groups) =    .857

DOMINANT TAXA:
 REFERENCE SITE                 COMPARISON SITE
 1 Baetis tricaudatus            Cinygmula
 2 Rhithrogena                   Baetis tricaudatus
 3 Drunella doddsi               Zapada Oregonensis Gr.
 4 Epeorus albertae              Drunella doddsi
 5 Cinygmula                     Ameletus
 6 Epeorus grandis               Hesperoperla pacifica
 7 Glossosoma                    Rheocricotopus
 8 Megarcys                      Tvetenia
 9 Yoraperla                     Zapada columbiana
10 Brachycentrus americanus      Doroneuria

DOMINANTS IN COMMON
Among 5 most abundant  =  3.
Among 10 most abundant =  3.
```

```
                   METRIC SUMMARY: DUAL SITE COMPARISON

 REFERENCE SITE:
Montana: Montane Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III.  Riffle samples.
Mean abundances of 34 most numerous taxa.
File: MONTANEA

 COMPARISON SITE:
Seymour Creek, July 28, 1990


REFERENCE SITE:                 COMPARISON SITE:
Total abundance   =    501.     Total abundance   =    387.
Total number taxa =     34.     Total number taxa =     58.
Number EPT taxa   =     26.     Number EPT taxa   =     35.

Total taxa in common =    24.
EPT taxa in common   =    18.

Community loss index  =    .172
Jaccard similarity    =    .353
Common taxa index     =    .414
Pinkham-Pearson similarity index (B2): SI      =    .009
Quantitative similarity index                  =    .469
Quantitative similarity index (Feeding groups) =    .785

DOMINANT TAXA:
 REFERENCE SITE                   COMPARISON SITE
 1 Baetis tricaudatus              Epeorus albertae
 2 Rhithrogena                     Eukiefferiella
 3 Drunella doddsi                 Parapsyche elsis
 4 Epeorus albertae                Baetis tricaudatus
 5 Cinygmula                       Cinygmula
 6 Epeorus grandis                 Epeorus longimanus
 7 Glossosoma                      Micrasema
 8 Megarcys                        Serratella tibialis
 9 Yoraperla                       Zapada columbiana
10 Brachycentrus americanus        Tvetenia

DOMINANTS IN COMMON
Among 5 most abundant  =  3.
Among 10 most abundant =  3.
```

METRIC SUMMARY: DUAL SITE COMPARISON

```
 REFERENCE SITE:
```

Montana: Montane Reference Community-1990 Version.

```
Modified Rapid Bioassessment Protocol III.  Riffle samples.
Mean abundances of 34 most numerous taxa.
File: MONTANEA

 COMPARISON SITE:
```

W.F. Stillwater River, RBP1D, Aug 21, 1990.

```
REFERENCE SITE:                 COMPARISON SITE:
Total abundance   =    501.     Total abundance   =    569.
Total number taxa =     34.     Total number taxa =     36.
Number EPT taxa   =     26.     Number EPT taxa   =     26.

Total taxa in common =    19.
EPT taxa in common   =    14.

Community loss index  =    .417
Jaccard similarity    =    .373
Common taxa index     =    .528
Pinkham-Pearson similarity index (B2): SI       =    .013
Quantitative similarity index                   =    .449
Quantitative similarity index (Feeding groups) =    .754

DOMINANT TAXA:
 REFERENCE SITE                  COMPARISON SITE
 1 Baetis tricaudatus             Epeorus albertae
 2 Rhithrogena                    Cinygmula
 3 Drunella doddsi                Drunella doddsi
 4 Epeorus albertae               Rhithrogena
 5 Cinygmula                      Baetis tricaudatus
 6 Epeorus grandis                Epeorus
 7 Glossosoma                     Drunella coloradensis
 8 Megarcys                       Rhyacophila Brunnea Gr.
 9 Yoraperla                      Eukiefferiella
10 Brachycentrus americanus       Tvetenia

DOMINANTS IN COMMON
Among 5 most abundant  =  5.
Among 10 most abundant =  5.
```

```
                    METRIC SUMMARY: DUAL SITE COMPARISON

 REFERENCE SITE:
Montana: Montane Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III.  Riffle samples.
Mean abundances of 34 most numerous taxa.
File: MONTANEA

 COMPARISON SITE:
W.F. Stillwater River, RBP2U, Aug.21, 1990.


REFERENCE SITE:                COMPARISON SITE:
Total abundance    =    501.   Total abundance    =    316.
Total number taxa =      34.   Total number taxa =      38.
Number EPT taxa    =     26.   Number EPT taxa    =     24.

Total taxa in common =    20.
EPT taxa in common   =    15.

Community loss index  =    .368
Jaccard similarity    =    .385
Common taxa index     =    .526
Pinkham-Pearson similarity index (B2): SI       =    .012
Quantitative similarity index                   =    .456
Quantitative similarity index (Feeding groups) =    .849

DOMINANT TAXA:
 REFERENCE SITE                 COMPARISON SITE
 1 Baetis tricaudatus            Epeorus albertae
 2 Rhithrogena                   Cinygmula
 3 Drunella doddsi               Baetis tricaudatus
 4 Epeorus albertae              Drunella doddsi
 5 Cinygmula                     Rhithrogena
 6 Epeorus grandis               Tvetenia
 7 Glossosoma                    Drunella coloradensis
 8 Megarcys                      Serratella tibialis
 9 Yoraperla                     Hexatoma
10 Brachycentrus americanus      Chironomidae-pupae

DOMINANTS IN COMMON
Among 5 most abundant  =  5.
Among 10 most abundant =  5.
```

```
                         METRIC SUMMARY: DUAL SITE COMPARISON

 REFERENCE SITE:
Montana: Montane Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III.  Riffle samples.
Mean abundances of 34 most numerous taxa.
File: MONTANEA

 COMPARISON SITE:
Stoney Creek, August 30, 1990


REFERENCE SITE:                 COMPARISON SITE:
Total abundance    =    501.    Total abundance    =    474.
Total number taxa =      34.    Total number taxa =      49.
Number EPT taxa    =     26.    Number EPT taxa    =     34.

Total taxa in common =    22.
EPT taxa in common   =    16.

Community loss index  =    .245
Jaccard similarity    =    .361
Common taxa index     =    .449
Pinkham-Pearson similarity index (B2): SI       =    .014
Quantitative similarity index                   =    .563
Quantitative similarity index (Feeding groups) =    .783

DOMINANT TAXA:
 REFERENCE SITE                  COMPARISON SITE
 1 Baetis tricaudatus             Epeorus albertae
 2 Rhithrogena                    Epeorus grandis
 3 Drunella doddsi                Yoraperla
 4 Epeorus albertae               Rhithrogena
 5 Cinygmula                      Zapada columbiana
 6 Epeorus grandis                Cinygmula
 7 Glossosoma                     Cricotopus Nostococladius
 8 Megarcys                       Ecclisomyia
 9 Yoraperla                      Drunella doddsi
10 Brachycentrus americanus       Parapsyche elsis

DOMINANTS IN COMMON
Among 5 most abundant  =  2.
Among 10 most abundant =  6.
```

```
                      METRIC SUMMARY: DUAL SITE COMPARISON

 REFERENCE SITE:
Montana: Montane Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III.  Riffle samples.
Mean abundances of 34 most numerous taxa.
File: MONTANEA

 COMPARISON SITE:
S.F. Sun River, Sept 12, 1990


REFERENCE SITE:                    COMPARISON SITE:
Total abundance    =    501.       Total abundance     =     916.
Total number taxa  =     34.       Total number taxa  =       43.
Number EPT taxa    =     26.       Number EPT taxa     =      27.

Total taxa in common =    20.
EPT taxa in common   =    15.

Community loss index  =    .326
Jaccard similarity    =    .351
Common taxa index     =    .465
Pinkham-Pearson similarity index (B2): SI       =    .008
Quantitative similarity index                   =    .496
Quantitative similarity index (Feeding groups)  =    .795

DOMINANT TAXA:
 REFERENCE SITE                       COMPARISON SITE
 1 Baetis tricaudatus                  Drunella doddsi
 2 Rhithrogena                         Rhithrogena
 3 Drunella doddsi                     Epeorus longimanus
 4 Epeorus albertae                    Zapada Oregonensis Gr.
 5 Cinygmula                           Baetis tricaudatus
 6 Epeorus grandis                     Rhyacophila Brunnea Gr.
 7 Glossosoma                          Drunella grandis
 8 Megarcys                            Brachycentrus americanus
 9 Yoraperla                           Orthocladius
10 Brachycentrus americanus            Epeorus albertae

DOMINANTS IN COMMON
Among 5 most abundant  =  3.
Among 10 most abundant =  5.
```

```
                    METRIC SUMMARY: DUAL SITE COMPARISON

 REFERENCE SITE:
Montana: Montane Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III.  Riffle samples.
Mean abundances of 34 most numerous taxa.
File: MONTANEA

 COMPARISON SITE:
Tenderfoot Creek, Sept. 6, 1990.


REFERENCE SITE:                 COMPARISON SITE:
Total abundance   =    501.     Total abundance   =   1184.
Total number taxa =     34.     Total number taxa =     32.
Number EPT taxa   =     26.     Number EPT taxa   =     20.

Total taxa in common =    17.
EPT taxa in common   =    13.

Community loss index  =    .531
Jaccard similarity    =    .347
Common taxa index     =    .500
Pinkham-Pearson similarity index (B2): SI      =    .002
Quantitative similarity index                  =    .277
Quantitative similarity index (Feeding groups) =    .737

DOMINANT TAXA:
 REFERENCE SITE                  COMPARISON SITE
 1 Baetis tricaudatus             Brachycentrus americanus
 2 Rhithrogena                    Orthocladius
 3 Drunella doddsi                Glossosoma
 4 Epeorus albertae               Optioservus
 5 Cinygmula                      Cricotopus Nostococladius
 6 Epeorus grandis                Lepidostoma-sand case larvae
 7 Glossosoma                     Apatania
 8 Megarcys                       Antocha
 9 Yoraperla                      Hydropsyche
10 Brachycentrus americanus       Drunella grandis

DOMINANTS IN COMMON
Among 5 most abundant  =  0.
Among 10 most abundant =  2.
```

```
                    METRIC SUMMARY: DUAL SITE COMPARISON

 REFERENCE SITE:
Montana: Montane Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III.  Riffle samples.
Mean abundances of 34 most numerous taxa.
File: MONTANEA

 COMPARISON SITE:
N.F. Teton River, Sept. 11, 1990.


REFERENCE SITE:                 COMPARISON SITE:
Total abundance   =     501.    Total abundance   =     522.
Total number taxa =      34.    Total number taxa =      25.
Number EPT taxa   =      26.    Number EPT taxa   =      21.

Total taxa in common =    16.
EPT taxa in common   =    15.

Community loss index  =    .720
Jaccard similarity    =    .372
Common taxa index     =    .471
Pinkham-Pearson similarity index (B2): SI      =    .016
Quantitative similarity index                  =    .507
Quantitative similarity index (Feeding groups) =    .777

DOMINANT TAXA:
 REFERENCE SITE                  COMPARISON SITE
 1 Baetis tricaudatus             Rhithrogena
 2 Rhithrogena                    Zapada Oregonensis Gr.
 3 Drunella doddsi                Baetis tricaudatus
 4 Epeorus albertae               Drunella doddsi
 5 Cinygmula                      Epeorus albertae
 6 Epeorus grandis                Zapada columbiana
 7 Glossosoma                     Epeorus grandis
 8 Megarcys                       Cinygmula
 9 Yoraperla                      Megarcys
10 Brachycentrus americanus       Drunella grandis

DOMINANTS IN COMMON
Among 5 most abundant  =  4.
Among 10 most abundant =  7.
```

METRIC SUMMARY: DUAL SITE COMPARISON

REFERENCE SITE:
Montana: Montane Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III. Riffle samples.
Mean abundances of 34 most numerous taxa.
File: MONTANEA

COMPARISON SITE:
Waldron Creek, Sept. 11, 1990.

REFERENCE SITE:		COMPARISON SITE:	
Total abundance =	501.	Total abundance =	828.
Total number taxa =	34.	Total number taxa =	32.
Number EPT taxa =	26.	Number EPT taxa =	24.

Total taxa in common = 16.
EPT taxa in common = 13.

Community loss index = .563
Jaccard similarity = .320
Common taxa index = .471
Pinkham-Pearson similarity index (B2): SI = .009
Quantitative similarity index = .430
Quantitative similarity index (Feeding groups) = .590

DOMINANT TAXA:

	REFERENCE SITE	COMPARISON SITE
1	Baetis tricaudatus	Yoraperla
2	Rhithrogena	Drunella doddsi
3	Drunella doddsi	Baetis tricaudatus
4	Epeorus albertae	Zapada columbiana
5	Cinygmula	Megarcys
6	Epeorus grandis	Rhithrogena
7	Glossosoma	Turbellaria
8	Megarcys	Oreogeton
9	Yoraperla	Rhyacophila Hyalinata Gr.
10	Brachycentrus americanus	Epeorus grandis

DOMINANTS IN COMMON
Among 5 most abundant = 2.
Among 10 most abundant = 6.

METRIC SUMMARY: DUAL SITE COMPARISON

REFERENCE SITE:
Montana: Montane Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III. Riffle samples.
Mean abundances of 34 most numerous taxa.
File: MONTANEA

COMPARISON SITE:
Wisconson Creek, August 4, 1990.

REFERENCE SITE:		COMPARISON SITE:	
Total abundance =	501.	Total abundance =	846.
Total number taxa =	34.	Total number taxa =	36.
Number EPT taxa =	26.	Number EPT taxa =	18.

Total taxa in common = 13.
EPT taxa in common = 7.

Community loss index = .583
Jaccard similarity = .228
Common taxa index = .361
Pinkham-Pearson similarity index (B2): SI = .001
Quantitative similarity index = .131
Quantitative similarity index (Feeding groups) = .827

DOMINANT TAXA:

	REFERENCE SITE	COMPARISON SITE
1	Baetis tricaudatus	Neothremma alicia
2	Rhithrogena	Zapada columbiana
3	Drunella doddsi	Ameletus
4	Epeorus albertae	Micropsectra
5	Cinygmula	Turbellaria
6	Epeorus grandis	Rhyacophila Iranda Gr.
7	Glossosoma	Cinygma
8	Megarcys	Cricotopus Nostococladius
9	Yoraperla	Cinygmula
10	Brachycentrus americanus	Tipula

DOMINANTS IN COMMON
Among 5 most abundant = 0.
Among 10 most abundant = 1.

METRIC SUMMARY: DUAL SITE COMPARISON

REFERENCE SITE:
Montana: Plains Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III.
Mean abundances of 29 most numerous taxa.
File: PLAINSA

COMPARISON SITE:
Battle Creek north of Chinook, 02-1A, August 21, 1990.

REFERENCE SITE:		COMPARISON SITE:	
Total abundance =	3472.	Total abundance =	3076.
Total number taxa =	29.	Total number taxa =	41.
Number EPT taxa =	5.	Number EPT taxa =	11.

Total taxa in common = 19.
EPT taxa in common = 3.

Community loss index = .244
Jaccard similarity = .373
Common taxa index = .463
Pinkham-Pearson similarity index (B2): SI = .020
Quantitative similarity index = .506
Quantitative similarity index (Feeding groups) = .919

DOMINANT TAXA:

	REFERENCE SITE	COMPARISON SITE
1	Physella	Micropsectra
2	Hyallela azteca	Hyallela azteca
3	Caenis	Caenis
4	Simuliidae	Oligochaeta
5	Cladocera	Physella
6	Coenagrionidae	Cheumatopsyche
7	Callibaetis	Tanytarsus
8	Cheumatopsyche	Paratanytarsus
9	Oligochaeta	Gyraulus
10	Planorbidae	Acari

DOMINANTS IN COMMON
Among 5 most abundant = 3.
Among 10 most abundant = 5.

METRIC SUMMARY: DUAL SITE COMPARISON

```
 REFERENCE SITE:
Montana: Plains Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III.
Mean abundances of 29 most numerous taxa.
File: PLAINSA

 COMPARISON SITE:
Battle Creek north of Chinook, 02-1B, August 21, 1990.


REFERENCE SITE:                   COMPARISON SITE:
Total abundance    =   3472.    Total abundance    =   1116.
Total number taxa =      29.    Total number taxa =      27.
Number EPT taxa    =      5.    Number EPT taxa    =       9.

Total taxa in common =    13.
EPT taxa in common   =     3.

Community loss index  =    .593
Jaccard similarity    =    .302
Common taxa index     =    .448
Pinkham-Pearson similarity index (B2): SI      =    .006
Quantitative similarity index                  =    .350
Quantitative similarity index (Feeding groups) =    .717

DOMINANT TAXA:
 REFERENCE SITE                   COMPARISON SITE
 1 Physella                        Cheumatopsyche
 2 Hyallela azteca                 Physella
 3 Caenis                          Micropsectra
 4 Simuliidae                      Coenagrion/Enallagma
 5 Cladocera                       Hyallela azteca
 6 Coenagrionidae                  Ferrissia
 7 Callibaetis                     Caenis
 8 Cheumatopsyche                  Tanytarsus
 9 Oligochaeta                     Acari
10 Planorbidae                     Stenonema

DOMINANTS IN COMMON
Among 5 most abundant  =  2.
Among 10 most abundant =  4.
```

```
                    METRIC SUMMARY: DUAL SITE COMPARISON

 REFERENCE SITE:
Montana: Plains Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III.
Mean abundances of 29 most numerous taxa.
File: PLAINSA

 COMPARISON SITE:
Box Elder Creek, Riffle, July 18, 1990.


REFERENCE SITE:                 COMPARISON SITE:
Total abundance    =   3472.    Total abundance    =    314.
Total number taxa =      29.    Total number taxa =      27.
Number EPT taxa    =      5.    Number EPT taxa    =     10.

Total taxa in common =    13.
EPT taxa in common   =     3.

Community loss index  =    .593
Jaccard similarity    =    .302
Common taxa index     =    .448
Pinkham-Pearson similarity index (B2): SI      =    .002
Quantitative similarity index                  =    .277
Quantitative similarity index (Feeding groups) =    .665

DOMINANT TAXA:
 REFERENCE SITE                  COMPARISON SITE
 1 Physella                       Stenonema
 2 Hyallela azteca                Dicrotendipes
 3 Caenis                         Pseudochironomus
 4 Simuliidae                     Cheumatopsyche
 5 Cladocera                      Caenis
 6 Coenagrionidae                 Corixidae
 7 Callibaetis                    Coenagrionidae
 8 Cheumatopsyche                 Hydropsyche
 9 Oligochaeta                    Polycentropus
10 Planorbidae                    Conchapelopia/Thienemannimyi

DOMINANTS IN COMMON
Among 5 most abundant  =  1.
Among 10 most abundant =  3.
```

```
                    METRIC SUMMARY: DUAL SITE COMPARISON

 REFERENCE SITE:
Montana: Plains Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III.
Mean abundances of 29 most numerous taxa.
File: PLAINSA

 COMPARISON SITE:
Hanging Woman Creek near Birney, July 19, 1990.


REFERENCE SITE:                 COMPARISON SITE:
Total abundance    =   3472.    Total abundance    =  17104.
Total number taxa =      29.    Total number taxa =      33.
Number EPT taxa    =      5.    Number EPT taxa    =       3.

Total taxa in common =    17.
EPT taxa in common   =     3.

Community loss index  =    .364
Jaccard similarity    =    .378
Common taxa index     =    .515
Pinkham-Pearson similarity index (B2): SI       =    .008
Quantitative similarity index                   =    .559
Quantitative similarity index (Feeding groups) =    .784

DOMINANT TAXA:
 REFERENCE SITE                  COMPARISON SITE
 1 Physella                       Physella
 2 Hyallela azteca                Caenis
 3 Caenis                         Coenagrionidae
 4 Simuliidae                     Callibaetis
 5 Cladocera                      Oligochaeta
 6 Coenagrionidae                 Ceratopogonidae
 7 Callibaetis                    Pseudochironomus
 8 Cheumatopsyche                 Cladocera
 9 Oligochaeta                    Ostracoda
10 Planorbidae                    Gyraulus

DOMINANTS IN COMMON
Among 5 most abundant  =  2.
Among 10 most abundant =  6.
```

```
                    METRIC SUMMARY: DUAL SITE COMPARISON

 REFERENCE SITE:
Montana: Plains Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III.
Mean abundances of 29 most numerous taxa.
File: PLAINSA

 COMPARISON SITE:
Larb Creek, near mouth, near Saco, July 17, 1990.


REFERENCE SITE:                 COMPARISON SITE:
Total abundance    =   3472.    Total abundance    =   1316.
Total number taxa  =     29.    Total number taxa  =     28.
Number EPT taxa    =      5.    Number EPT taxa    =      5.

Total taxa in common =    12.
EPT taxa in common   =     1.

Community loss index  =    .607
Jaccard similarity    =    .267
Common taxa index     =    .414
Pinkham-Pearson similarity index (B2): SI      =    .007
Quantitative similarity index                  =    .362
Quantitative similarity index (Feeding groups) =    .532

DOMINANT TAXA:
 REFERENCE SITE                  COMPARISON SITE
 1 Physella                       Gyraulus
 2 Hyallela azteca                Corixidae
 3 Caenis                         Physella
 4 Simuliidae                     Coenagrionidae
 5 Cladocera                      Oligochaeta
 6 Coenagrionidae                 Callibaetis
 7 Callibaetis                    Caenidae
 8 Cheumatopsyche                 Hyallela azteca
 9 Oligochaeta                    Cladocera
10 Planorbidae                    Acari

DOMINANTS IN COMMON
Among 5 most abundant  =  1.
Among 10 most abundant =  6.
```

```
                    METRIC SUMMARY: DUAL SITE COMPARISON

 REFERENCE SITE:
Montana: Plains Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III.
Mean abundances of 29 most numerous taxa.
File: PLAINSA

 COMPARISON SITE:
O'Fallon Creek at Hwy. 12. July 18, 1990


REFERENCE SITE:                        COMPARISON SITE:
Total abundance    =   3472.     Total abundance    =     656.
Total number taxa =      29.     Total number taxa =       17.
Number EPT taxa    =      5.     Number EPT taxa    =       2.

Total taxa in common =     9.
EPT taxa in common   =     2.

Community loss index  =  1.176
Jaccard similarity    =   .243
Common taxa index     =   .310
Pinkham-Pearson similarity index (B2): SI       =    .003
Quantitative similarity index                    =    .218
Quantitative similarity index (Feeding groups) =    .425

DOMINANT TAXA:
 REFERENCE SITE                    COMPARISON SITE
 1 Physella                         Corixidae
 2 Hyallela azteca                  Coenagrionidae
 3 Caenis                           Caenis
 4 Simuliidae                       Pseudochironomus
 5 Cladocera                        Callibaetis
 6 Coenagrionidae                   Procladius
 7 Callibaetis                      Ceratopogonidae
 8 Cheumatopsyche                   Cladotanytarsus
 9 Oligochaeta                      Tanypus
10 Planorbidae                      Cryptotendipes

DOMINANTS IN COMMON
Among 5 most abundant  =  1.
Among 10 most abundant =  3.
```

METRIC SUMMARY: DUAL SITE COMPARISON

```
 REFERENCE SITE:
Montana: Plains Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III.
Mean abundances of 29 most numerous taxa.
File: PLAINSA

 COMPARISON SITE:
W.F. Poplar River at Hwy. 13. RBP 04-1A, August 22, 1990.


REFERENCE SITE:                 COMPARISON SITE:
Total abundance   =   3472.     Total abundance   =   4912.
Total number taxa =     29.     Total number taxa =     26.
Number EPT taxa   =      5.     Number EPT taxa   =      6.

Total taxa in common =    13.
EPT taxa in common   =     3.

Community loss index  =    .615
Jaccard similarity    =    .310
Common taxa index     =    .448
Pinkham-Pearson similarity index (B2): SI       =    .002
Quantitative similarity index                   =    .143
Quantitative similarity index (Feeding groups) =    .331

DOMINANT TAXA:
 REFERENCE SITE                  COMPARISON SITE
 1 Physella                       Simulium
 2 Hyallela azteca                Cheumatopsyche
 3 Caenis                         Coenagrionidae
 4 Simuliidae                     Rheotanytarsus
 5 Cladocera                      Callibaetis
 6 Coenagrionidae                 Hyallela azteca
 7 Callibaetis                    Physella
 8 Cheumatopsyche                 Conchapelopia/Thienemannimyi
 9 Oligochaeta                    Baetis
10 Planorbidae                    Psectrocladius

DOMINANTS IN COMMON
Among 5 most abundant  =  0.
Among 10 most abundant =  5.
```

```
                         METRIC SUMMARY: DUAL SITE COMPARISON

 REFERENCE SITE:
Montana: Plains Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III.
Mean abundances of 29 most numerous taxa.
File: PLAINSA

 COMPARISON SITE:
W.F. Popular R. at Hwy. 13, RBP 04-1B, Aug 22, 1990.


REFERENCE SITE:                   COMPARISON SITE:
Total abundance    =   3472.      Total abundance    =    1018.
Total number taxa =      29.      Total number taxa =       39.
Number EPT taxa    =      5.      Number EPT taxa    =       11.

Total taxa in common =    17.
EPT taxa in common   =     3.

Community loss index  =    .308
Jaccard similarity    =    .333
Common taxa index     =    .436
Pinkham-Pearson similarity index (B2): SI       =    .019
Quantitative similarity index                   =    .353
Quantitative similarity index (Feeding groups) =    .626

DOMINANT TAXA:
 REFERENCE SITE                      COMPARISON SITE
 1 Physella                           Simuliidae
 2 Hyallela azteca                    Hyallela azteca
 3 Caenis                             Baetis
 4 Simuliidae                         Rheotanytarsus
 5 Cladocera                          Isonychia
 6 Coenagrionidae                     Cheumatopsyche
 7 Callibaetis                        Chironomidae-pupae
 8 Cheumatopsyche                     Micropsectra
 9 Oligochaeta                        Physella
10 Planorbidae                        Callibaetis

DOMINANTS IN COMMON
Among 5 most abundant  =  2.
Among 10 most abundant =  5.
```

METRIC SUMMARY: DUAL SITE COMPARISON

```
 REFERENCE SITE:
Montana: Plains Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III.
Mean abundances of 29 most numerous taxa.
File: PLAINSA

 COMPARISON SITE:
Redwater River at hwy 201, RBP 06-1, August 23, 1990.


REFERENCE SITE:                 COMPARISON SITE:
Total abundance   =   3472.     Total abundance   =     260.
Total number taxa =     29.     Total number taxa =      11.
Number EPT taxa   =      5.     Number EPT taxa   =       1.

Total taxa in common =     7.
EPT taxa in common   =     1.

Community loss index  =   2.000
Jaccard similarity    =    .212
Common taxa index     =    .241
Pinkham-Pearson similarity index (B2): SI       =    .006
Quantitative similarity index                   =    .205
Quantitative similarity index (Feeding groups) =    .622

DOMINANT TAXA:
 REFERENCE SITE                 COMPARISON SITE
 1 Physella                      Coenagrionidae
 2 Hyallela azteca               Micropsectra
 3 Caenis                        Dicrotendipes
 4 Simuliidae                    Pacifasticus
 5 Cladocera                     Caenis
 6 Coenagrionidae                Corixidae
 7 Callibaetis                   Endochironomus
 8 Cheumatopsyche                Paratanytarsus
 9 Oligochaeta                   Dubiraphia
10 Planorbidae                   Conchapelopia/Thienemannimyi

DOMINANTS IN COMMON
Among 5 most abundant  =  1.
Among 10 most abundant =  2.
```

METRIC SUMMARY: DUAL SITE COMPARISON

REFERENCE SITE:
Montana: Plains Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III.
Mean abundances of 29 most numerous taxa.
File: PLAINSA

COMPARISON SITE:
Rock Cr. NE of Hinsdale, RBP 03-1, August 22, 1990.

REFERENCE SITE:		COMPARISON SITE:	
Total abundance =	3472.	Total abundance =	2355.
Total number taxa =	29.	Total number taxa =	37.
Number EPT taxa =	5.	Number EPT taxa =	4.

Total taxa in common = 16.
EPT taxa in common = 2.

Community loss index = .351
Jaccard similarity = .320
Common taxa index = .432
Pinkham-Pearson similarity index (B2): SI = .006
Quantitative similarity index = .340
Quantitative similarity index (Feeding groups) = .721

DOMINANT TAXA:

	REFERENCE SITE	COMPARISON SITE
1	Physella	Paratanytarsus
2	Hyallela azteca	Dicrotendipes
3	Caenis	Oligochaeta
4	Simuliidae	Hyallela azteca
5	Cladocera	Endochironomus
6	Coenagrionidae	Caenis
7	Callibaetis	Coenagrionidae
8	Cheumatopsyche	Simulium
9	Oligochaeta	Tanytarsus
10	Planorbidae	Corixidae

DOMINANTS IN COMMON
Among 5 most abundant = 1.
Among 10 most abundant = 4.

```
                       METRIC SUMMARY: DUAL SITE COMPARISON

 REFERENCE SITE:
Montana: Plains Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III.
Mean abundances of 29 most numerous taxa.
File: PLAINSA

 COMPARISON SITE:
Tongue River near Pyramid Butte, July 19, 1990.


REFERENCE SITE:                       COMPARISON SITE:
Total abundance    =   3472.    Total abundance    =   2376.
Total number taxa =      29.    Total number taxa =      27.
Number EPT taxa    =       5.    Number EPT taxa    =      12.

Total taxa in common =     6.
EPT taxa in common   =     1.

Community loss index  =    .852
Jaccard similarity    =    .120
Common taxa index     =    .207
Pinkham-Pearson similarity index (B2): SI       =    .000
Quantitative similarity index                   =    .062
Quantitative similarity index (Feeding groups) =    .770

DOMINANT TAXA:
 REFERENCE SITE                  COMPARISON SITE
 1 Physella                       Stenelmis
 2 Hyallela azteca                Baetidae
 3 Caenis                         Leptophlebiidae
 4 Simuliidae                     Turbellaria
 5 Cladocera                      Ambrysus
 6 Coenagrionidae                 Simulium
 7 Callibaetis                    Oligochaeta
 8 Cheumatopsyche                 Tricorythodes minutus
 9 Oligochaeta                    Cricotopus
10 Planorbidae                    Physella

DOMINANTS IN COMMON
Among 5 most abundant  =  0.
Among 10 most abundant =  2.
```

```
                     METRIC SUMMARY: DUAL SITE COMPARISON

 REFERENCE SITE:
Montana: Plains Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III.
Mean abundances of 29 most numerous taxa.
File: PLAINSA

 COMPARISON SITE:
Tule Creek at hwy 13, RBP 05-1, August 23, 1990.


REFERENCE SITE:                COMPARISON SITE:
Total abundance    =   3472.   Total abundance    =   1516.
Total number taxa  =     29.   Total number taxa  =     26.
Number EPT taxa    =      5.   Number EPT taxa    =      4.

Total taxa in common =    14.
EPT taxa in common   =     2.

Community loss index  =    .577
Jaccard similarity    =    .341
Common taxa index     =    .483
Pinkham-Pearson similarity index (B2): SI       =    .015
Quantitative similarity index                   =    .507
Quantitative similarity index (Feeding groups)  =    .790

DOMINANT TAXA:
 REFERENCE SITE                 COMPARISON SITE
 1 Physella                      Hyallela azteca
 2 Hyallela azteca               Physella
 3 Caenis                        Coenagrionidae
 4 Simuliidae                    Gammarus
 5 Cladocera                     Dicrotendipes
 6 Coenagrionidae                Oligochaeta
 7 Callibaetis                   Haliplus
 8 Cheumatopsyche                Callibaetis
 9 Oligochaeta                   Cladocera
10 Planorbidae                   Corixidae

DOMINANTS IN COMMON
Among 5 most abundant  =  2.
Among 10 most abundant =  6.
```

METRIC SUMMARY: DUAL SITE COMPARISON

```
 REFERENCE SITE:
Montana: Plains Reference Community-1990 Version.
Modified Rapid Bioassessment Protocol III.
Mean abundances of 29 most numerous taxa.
File: PLAINSA

 COMPARISON SITE:
Willow Creek at hwy 2, RBP#1, August 20, 1990.


REFERENCE SITE:                  COMPARISON SITE:
Total abundance   =    3472.     Total abundance   =  12379.
Total number taxa =      29.     Total number taxa =     35.
Number EPT taxa   =       5.     Number EPT taxa   =      5.

Total taxa in common =    19.
EPT taxa in common   =     4.

Community loss index  =    .286
Jaccard similarity    =    .422
Common taxa index     =    .543
Pinkham-Pearson similarity index (B2): SI      =    .007
Quantitative similarity index                  =    .476
Quantitative similarity index (Feeding groups) =    .918

DOMINANT TAXA:
 REFERENCE SITE                  COMPARISON SITE
 1 Physella                       Hyallela azteca
 2 Hyallela azteca                Caenis
 3 Caenis                         Cladocera
 4 Simuliidae                     Paratanytarsus
 5 Cladocera                      Gyraulus
 6 Coenagrionidae                 Cricotopus
 7 Callibaetis                    Physella
 8 Cheumatopsyche                 Ablabesmyia
 9 Oligochaeta                    Hydroptila
10 Planorbidae                    Dicrotendipes

DOMINANTS IN COMMON
Among 5 most abundant  =  3.
Among 10 most abundant =  4.
```

METRIC SUMMARY: DUAL SITE COMPARISON

REFERENCE SITE:
Spring Creek Composite Reference Community-1990 Version.

COMPARISON SITE:
Armstrong Spring Creek, Sample 1, July 11, 1990.

```
REFERENCE SITE:                 COMPARISON SITE:
Total abundance    =   2320.    Total abundance    =   2546.
Total number taxa =      34.    Total number taxa =      24.
Number EPT taxa    =     16.    Number EPT taxa    =      7.

Total taxa in common =    13.
EPT taxa in common   =     5.

Community loss index  =    .875
Jaccard similarity    =    .289
Common taxa index     =    .382
Pinkham-Pearson similarity index (B2): SI      =    .004
Quantitative similarity index                  =    .237
Quantitative similarity index (Feeding groups) =    .526

DOMINANT TAXA:
 REFERENCE SITE                  COMPARISON SITE
 1 Lepidostoma                    Baetis tricaudatus
 2 Brachycentrus americanus       Eukiefferiella
 3 Hydropsyche                    Pagastia
 4 Optioservus                    Physella
 5 Baetis tricaudatus             Hydroptila
 6 Porifera                       Caecidotea
 7 Eukiefferiella                 Turbellaria
 8 Tvetenia                       Gammarus
 9 Agapetus                       Stagnicola
10 Ephemerella inermis            Hirudinea

DOMINANTS IN COMMON
Among 5 most abundant  =  1.
Among 10 most abundant =  2.
```

METRIC SUMMARY: DUAL SITE COMPARISON

REFERENCE SITE:
Spring Creek Composite Reference Community-1990 Version.

COMPARISON SITE:
Ben Hart Spring Creek, RBP5, July 16, 1990.

```
REFERENCE SITE:                          COMPARISON SITE:
Total abundance    =   2320.             Total abundance    =   2476.
Total number taxa =      34.             Total number taxa =      31.
Number EPT taxa    =     16.             Number EPT taxa    =     17.

Total taxa in common =    19.
EPT taxa in common   =    12.

Community loss index  =    .484
Jaccard similarity    =    .413
Common taxa index     =    .559
Pinkham-Pearson similarity index (B2): SI      =    .006
Quantitative similarity index                  =    .361
Quantitative similarity index (Feeding groups) =    .617

DOMINANT TAXA:
 REFERENCE SITE                           COMPARISON SITE
 1 Lepidostoma                             Agapetus
 2 Brachycentrus americanus                Baetis tricaudatus
 3 Hydropsyche                             Glossosoma
 4 Optioservus                             Eukiefferiella
 5 Baetis tricaudatus                      Ephemerella inermis
 6 Porifera                                Tricorythodes minutus
 7 Eukiefferiella                          Heptagenia
 8 Tvetenia                                Heterlimnius
 9 Agapetus                                Pagastia
10 Ephemerella inermis                     Diphetor hageni

DOMINANTS IN COMMON
Among 5 most abundant  =  1.
Among 10 most abundant =  4.
```

METRIC SUMMARY: DUAL SITE COMPARISON

REFERENCE SITE:
Spring Creek Composite Reference Community-1990 Version.

COMPARISON SITE:
Big Hole River above Hwy 34, July 23, 1990

```
REFERENCE SITE:                        COMPARISON SITE:
Total abundance    =    2320.   Total abundance    =    1828.
Total number taxa  =      34.   Total number taxa  =      39.
Number EPT taxa    =      16.   Number EPT taxa    =      21.

Total taxa in common =    17.
EPT taxa in common   =     9.

Community loss index  =    .436
Jaccard similarity    =    .304
Common taxa index     =    .436
Pinkham-Pearson similarity index (B2): SI       =    .004
Quantitative similarity index                   =    .247
Quantitative similarity index (Feeding groups) =    .491

DOMINANT TAXA:
 REFERENCE SITE                   COMPARISON SITE
 1 Lepidostoma                     Porifera
 2 Brachycentrus americanus        Glossosoma
 3 Hydropsyche                     Hydropsyche
 4 Optioservus                     Polypedilum
 5 Baetis tricaudatus              Serratella tibialis
 6 Porifera                        Nixe
 7 Eukiefferiella                  Zaitzevia parvula
 8 Tvetenia                        Epeorus albertae
 9 Agapetus                        Rheotanytarsus
10 Ephemerella inermis             Tvetenia

DOMINANTS IN COMMON
Among 5 most abundant  =  1.
Among 10 most abundant =  3.
```

METRIC SUMMARY: DUAL SITE COMPARISON

REFERENCE SITE:
Spring Creek Composite Reference Community-1990 Version.

COMPARISON SITE:
Big Hole River at Fishtrap, July 23, 1990

```
REFERENCE SITE:                   COMPARISON SITE:
Total abundance    =    2320.    Total abundance    =    3936.
Total number taxa =      34.    Total number taxa =      40.
Number EPT taxa    =      16.    Number EPT taxa    =      21.

Total taxa in common =    18.
EPT taxa in common   =    10.

Community loss index  =    .400
Jaccard similarity    =    .321
Common taxa index     =    .450
Pinkham-Pearson similarity index (B2): SI      =    .006
Quantitative similarity index                  =    .362
Quantitative similarity index (Feeding groups) =    .674

DOMINANT TAXA:
 REFERENCE SITE                   COMPARISON SITE
 1 Lepidostoma                     Hydropsyche
 2 Brachycentrus americanus        Tvetenia
 3 Hydropsyche                     Eukiefferiella
 4 Optioservus                     Nixe
 5 Baetis tricaudatus              Orthocladius
 6 Porifera                        Tricorythodes minutus
 7 Eukiefferiella                  Optioservus
 8 Tvetenia                        Cricotopus Nostococladius
 9 Agapetus                        Baetis tricaudatus
10 Ephemerella inermis             Hydroptila

DOMINANTS IN COMMON
Among 5 most abundant  =  1.
Among 10 most abundant =  5.
```

METRIC SUMMARY: DUAL SITE COMPARISON

REFERENCE SITE:
Spring Creek Composite Reference Community-1990 Version.

COMPARISON SITE:
Big Otter Creek at Bodmers. July 26, 1990. RBP1.

```
REFERENCE SITE:                 COMPARISON SITE:
Total abundance    =   2320.    Total abundance    =    824.
Total number taxa =      34.    Total number taxa =      38.
Number EPT taxa    =     16.    Number EPT taxa    =     14.

Total taxa in common =    18.
EPT taxa in common   =     6.

Community loss index  =    .421
Jaccard similarity    =    .333
Common taxa index     =    .474
Pinkham-Pearson similarity index (B2): SI       =    .009
Quantitative similarity index                   =    .320
Quantitative similarity index (Feeding groups) =    .785

DOMINANT TAXA:
 REFERENCE SITE                  COMPARISON SITE
 1 Lepidostoma                    Hydropsyche
 2 Brachycentrus americanus       Baetis tricaudatus
 3 Hydropsyche                    Brachycentrus
 4 Optioservus                    Helicopsyche borealis
 5 Baetis tricaudatus             Simuliidae
 6 Porifera                       Physella
 7 Eukiefferiella                 Wormaldia
 8 Tvetenia                       Hydroptila
 9 Agapetus                       Parametriocnemus
10 Ephemerella inermis            Sphaeriidae

DOMINANTS IN COMMON
Among 5 most abundant  =  2.
Among 10 most abundant =  2.
```

METRIC SUMMARY: DUAL SITE COMPARISON

REFERENCE SITE:
Spring Creek Composite Reference Community-1990 Version.

COMPARISON SITE:
Big Spring Creek below State Hatchery, July 25, 1990.

```
REFERENCE SITE:                     COMPARISON SITE:
Total abundance   =   2320.         Total abundance   =    5456.
Total number taxa =     34.         Total number taxa =      25.
Number EPT taxa   =     16.         Number EPT taxa   =      11.

Total taxa in common =    12.
EPT taxa in common   =     6.

Community loss index =    .880
Jaccard similarity   =    .255
Common taxa index    =    .353
Pinkham-Pearson similarity index (B2): SI       =    .003
Quantitative similarity index                   =    .187
Quantitative similarity index (Feeding groups) =    .488

DOMINANT TAXA:
 REFERENCE SITE                      COMPARISON SITE
 1 Lepidostoma                        Lepidostoma-sand case larvae
 2 Brachycentrus americanus           Brachycentrus americanus
 3 Hydropsyche                        Ephemerella inermis
 4 Optioservus                        Micrasema
 5 Baetis tricaudatus                 Baetis tricaudatus
 6 Porifera                           Glossosoma
 7 Eukiefferiella                     Cladotanytarsus
 8 Tvetenia                           Turbellaria
 9 Agapetus                           Physella
10 Ephemerella inermis                Acentrella turbida

DOMINANTS IN COMMON
Among 5 most abundant  =  2.
Among 10 most abundant =  3.
```

METRIC SUMMARY: DUAL SITE COMPARISON

REFERENCE SITE:
Spring Creek Composite Reference Community-1990 Version.

COMPARISON SITE:
Elk Creek, July 10, 1990.

```
REFERENCE SITE:                        COMPARISON SITE:
Total abundance    =    2320.          Total abundance    =    1450.
Total number taxa =       34.          Total number taxa =       41.
Number EPT taxa    =       16.          Number EPT taxa    =       21.

Total taxa in common =    23.
EPT taxa in common   =    13.

Community loss index  =    .268
Jaccard similarity    =    .442
Common taxa index     =    .561
Pinkham-Pearson similarity index (B2): SI       =    .007
Quantitative similarity index                   =    .423
Quantitative similarity index (Feeding groups) =    .705

DOMINANT TAXA:
 REFERENCE SITE                          COMPARISON SITE
 1 Lepidostoma                            Optioservus
 2 Brachycentrus americanus               Micropsectra
 3 Hydropsyche                            Ceratopogonidae
 4 Optioservus                            Hydropsyche
 5 Baetis tricaudatus                     Brachycentrus americanus
 6 Porifera                               Zaitzevia
 7 Eukiefferiella                         Ephemerella inermis
 8 Tvetenia                               Tvetenia
 9 Agapetus                               Baetis tricaudatus
10 Ephemerella inermis                    Amiocentrus aspilus

DOMINANTS IN COMMON
Among 5 most abundant  =  3.
Among 10 most abundant =  6.
```

METRIC SUMMARY: DUAL SITE COMPARISON

REFERENCE SITE:
Spring Creek Composite Reference Community-1990 Version.

COMPARISON SITE:
Odell Creek, RBP1, July 8, 1990.

```
REFERENCE SITE:                   COMPARISON SITE:
Total abundance    =   2320.      Total abundance    =   1668.
Total number taxa =      34.      Total number taxa =      34.
Number EPT taxa    =     16.      Number EPT taxa    =     16.

Total taxa in common =    16.
EPT taxa in common   =     9.

Community loss index  =    .529
Jaccard similarity    =    .308
Common taxa index     =    .471
Pinkham-Pearson similarity index (B2): SI      =    .005
Quantitative similarity index                  =    .224
Quantitative similarity index (Feeding groups) =    .548

DOMINANT TAXA:
 REFERENCE SITE                   COMPARISON SITE
 1 Lepidostoma                     Optioservus
 2 Brachycentrus americanus        Stagnicola
 3 Hydropsyche                     Glossosoma
 4 Optioservus                     Helicopsyche borealis
 5 Baetis tricaudatus              Brachycentrus occidentalis
 6 Porifera                        Oligochaeta
 7 Eukiefferiella                  Polypedilum
 8 Tvetenia                        Tricorythodes minutus
 9 Agapetus                        Attenella margarita
10 Ephemerella inermis             Baetis tricaudatus

DOMINANTS IN COMMON
Among 5 most abundant  =  1.
Among 10 most abundant =  2.
```

METRIC SUMMARY: DUAL SITE COMPARISON

REFERENCE SITE:
Spring Creek Composite Reference Community-1990 Version.

COMPARISON SITE:
Odell Creek, RBP2, July 8, 1990.

```
REFERENCE SITE:                         COMPARISON SITE:
Total abundance    =    2320.   Total abundance    =    780.
Total number taxa =      34.   Total number taxa =      34.
Number EPT taxa    =      16.   Number EPT taxa    =      16.

Total taxa in common =     16.
EPT taxa in common   =      8.

Community loss index  =    .529
Jaccard similarity    =    .308
Common taxa index     =    .471
Pinkham-Pearson similarity index (B2): SI      =    .009
Quantitative similarity index                  =    .285
Quantitative similarity index (Feeding groups) =    .635

DOMINANT TAXA:
 REFERENCE SITE                     COMPARISON SITE
 1 Lepidostoma                       Optioservus
 2 Brachycentrus americanus          Physella
 3 Hydropsyche                       Orthocladius
 4 Optioservus                       Brachycentrus occidentalis
 5 Baetis tricaudatus                Baetis tricaudatus
 6 Porifera                          Attenella margarita
 7 Eukiefferiella                    Cricotopus
 8 Tvetenia                          Polypedilum
 9 Agapetus                          Tricorythodes minutus
10 Ephemerella inermis               Rheotanytarsus

DOMINANTS IN COMMON
Among 5 most abundant  =  2.
Among 10 most abundant =  2.
```

HABITAT ASSESSMENT PROTOCOL

File: HABASPRO

Parameters and scoring for the 1990 Montana Habitat Assessment Field Data Sheet for the Rapid Bioassessment Protocols parallels the one proposed by Plafkin et al. (1989). Examples of the field data sheet follow.

For the 1990 Montana Reference stream project, a file has been constructed to store and summarize habitat assessment data for each site. These files follow. Data from subsequent years sampling can be entered easily and an updated summary produced quickly.

These files are Quattro Pro spreadsheet files. Each file has one graph showing "Trend of Total Score by Year". Additional graphs can be easily inserted on the spreadsheet file (e.g. to track trends of specific parameters). After several years data have accumulated, mean values can be calculated by inserting the appropriate formula in the mean column. Once ecoregion reference values have been established, this information can be inserted in the far right column for comparison.

The HABASS template can be easily modified if parameters and scoring criteria change over time.

Using Site Files:

1. The Quattro file name is listed on each sheet for each site.
2. Enter the two digit abbreviation for the year in the next column. Enter the month and day.
3. Enter the scores for each parameter.
4. If several years data have accumulated, enter the formula for computing mean values at the top of the mean column, and then copy down to the "Total Score" row (formula e.g. @avg(c8.f8)).
5. Enter Ecoregion Reference Values if available.
6. Press F9 for recalculation, and the spreadsheet will automatically update total scores and the total score trend graph. The calculation mode has been set on "manual", so it is necessary to push F9 to update, or to switch the mode to automatic.

Using the Template File:

1. Call up HABASS.WQ1 and enter data as above.
2. Place the site name in row 1, and the file name in row 4.
3. Press F9 to recalculate, and the spreadsheet will calculate totals and draw the total score trend graph.
4. Make sure you save the new site file under a new file name.

Montana, Reference Stream Project 1990

Rapid Bioassessment Protocol III
File: SITEDIR

SITE	Habitat Assessment FILE ID	Habitat Summary FILE ID
Armstrong Spring Creek	HAARMSPR	HSARMSPR
Battle Creek North of Chinook	HABATTLE	HSBATTLE
Ben Hart Spring Creek	HABENHAR	HSBENHAR
Big Creek	HABIG	HSBIG
Big Hole River above hwy 43	HABHR43	HSBHR43
Big Hole River at Fishtarp	HABHRFI	HSBHRFI
Big Spring Creek below State Hatchery	HABSCSH	HSBSCSH
Boulder River	HABOULD	HSBOULD
Box Elder Creek	HABOXEL	HSBOXEL
E.F. Bull River	HAEFBULL	HSEFBULL
Calf Creek	HACALF	HSCALF
Crooked Creek	HACROOK	HSCROOK
Elk Creek	HAELK	HSELK
S.F. Flathead River	HASFFLAT	HSSFFLAT
Four Mile Creek	HAFOUR	HSFOUR
West Gallatin River	HAWGALL	HSWGALL
Hanging Woman Creek near Birney	HAHANG	HSAHNG
Larb Creek near mouth	HALARB	HSLARB
Odell Spring Creek	HAODELL	HSODELL
Pine Creek above FS boundary	HAPINE	HSPINE
W.F. Poplar River at hwy 13	HAWPOP13	HSWPOP13
Redwater River at hwy 201	HARED201	HSRED201
Roaring Lion Creek near trailhead	HAROART	HSROART
Rock Creek NE Hinsdale	HAROCKH	HSROCKH
Lake Fork Rock Creek	HALFROCK	HSLFROCK
Seymour Creek	HASEYM	HSSEYM
W.F. Stillwater River	HAWFSTIL	HSWFSTIL
Stoney Creek	HASTONE	HSSTONE
S.F, Sun River	HASFSUN	HSSFSUN
Tenderfoot Creek	HATENDER	HSTENDER
N.F. Teton River	HANFTET	HSNFTET
Tongue River near Pyramid Butte	HATRPB	HSTRPB
Tule Creek downstream of hwy 13	HATULE13	HSTULE13
Waldron Creek	HAWALD	HSWALD
Willow Creek at hwy 2	HAWILL2	HSWILL2
Wisconsin Creek	HAWISC	HSWISC

Template File HABASS.WQ1 HABSUM.WQ1

gue[illegible]wer nr. Pyramid Butte
7/19/90

HABITAT ASSESSMENT FIELD DATA SHEET

Habitat Parameter	Excellent	Good	Fair	Poor
1. Bottom substrate/ available cover[a]	Greater than 50% rock gravel, or other stable habitat. 17 16-20	30-50% rock, gravel or other stable habitat. Adequate habitat. 11-15	10-30% rock gravel or other stable habitat. Habitat availability less than desirable. 6-10	Less than 10% rock gravel or other stable habitat. Lack of habitat is obvious. 0-5
2. Embeddedness[b]	Gravel, cobble, and boulder particles are between 0 and 25% surrounded by fine sediment 16-20	Gravel, cobble, and boulder particles are between 25 and 50% surrounded by fine sediment 12 11-15	Gravel, cobble, and boulder particle are between 50 and 75% surrounded by fine sediment 6-10	Gravel, cobble, and boulder particles are over 75% surrounded by fine sediment 0-5
3. 50.15 cms (5 cfs) Flow at rep. low flow[a]	(Cold >0.05 cms (2 cfs) Warm >0.15 cms (5 cfs) 16 10-20 16	0.03-0.05 cms (1-2 cfs) 0.05-0.15 cms (2-5 cfs) 11-15	0.01-0.03cms (.5-1 cfs) 0.03-0.05cms (1-2 cfs) 6-10	<0.01 cms (.5 cfs) <0.03 cms (1 cfs) 0-5
or >0.15 cms (5cfs) Velocity/depth 20 B	Slow (<0.3 m/s), deep (>0.5 m); slow, shallow (<0.5 m); fast (>0.3 m/s), deep; fast, shallow habitats all present 16-20	Only 3 of the 4 habitat categories present (missing riffles or runs receive lower score than missing pools). 11-15	Only 2 of the 4 habitat categories present (missing riffles/runs receive lower score). 6-10	Dominated by one velocity/depth category (usually pool).
4. *Channel alteration[a]	Little or no enlargement of islands or point bars, and/or no channelization. 13 12-15	Some new increase in bar formation, mostly from coarse gravel; and/or some channelization present. 8-11	Moderate deposition of new gravel, coarse sand on old and new bars; pools partially filled w/silt; and/or embankments on both banks. 4-7	Heavy deposits of fine material, increased bar development; most pools filled w/silt; and/or extensive channelization. 0-3
5. Bottom scouring and deposition[a]	Less than 5% of the bottom affected by scouring and deposition. 13 12-15	5-30% affected. Scour at constructions and where grades steepen. Some deposition in pools. 8-11	30-50% affected. Deposits and scour at obstructions, constrictions and bends. Some filling of pools. 4-7	More than 50% of the bottom changing nearly year long. Pools almost absent due to deposition. Only large rocks in riffle exposed. 0-3

HABITAT ASSESSMENT FIELD DATA SHEET (Continued)

Habitat Parameter	Excellent	Good	Fair	Poor
6. Pool/riffle, run/bend ratio[a] (distance between riffles divided by stream width)	5-7. Variety of habitat. Deep riffles and pools. 12-15	7-15. Adequate depth in pools and riffles. Bends provide habitat. 11 8-11	Occasional riffle or bend. Bottom contours provide some habitat. 4-7	>25. Essentially a straight stream. Generally all flat water or shallow riffle. Poor habitat. 0-3
7. Bank stability[a]	Stable. No evidence of erosion or bank failure. Side slopes generally <30%. Little potential for future problem. 9-10	Moderately stable. Infrequent, small areas of erosion mostly healed over. Side slopes up to 40% on one bank. Slight potential in extreme floods. 7 6-8	Moderately unstable. Moderate frequency and size of erosional areas. Side slopes up to 60% on some banks. High erosion potential during extreme high flow. 3-5	Unstable. Many eroded areas. Side slopes <60% common. "Raw" areas frequent along straight sections and bends. 0-2
8. Bank vegetative stability[b]	Over 80% of the streambank surfaces covered by vegetation or boulders and cobble. 9 9-10	50-79% of the streambank surfaces covered by vegetation, gravel or larger material. 6-8	25-49% of the streambank surfaces covered by vegetation, gravel, or larger material. 3-5	Less than 25% of the streambank surfaces covered by vegetation, gravel, or larger material. 0-2
9. Streamside cover[b]	Dominant vegetation is shrub. 9-10	Dominant vegetation is of tree form. 8 6-8	Dominant vegetation is grass or forbes. 3-5	Over 50% of the streambank has no vegetation and dominant material is soil, rock, bridge materials, culverts, or mine tailings. 0-2
Column Totals Score 106	68	38	____	____

68+38 = 10.6 + 4 = 110

---

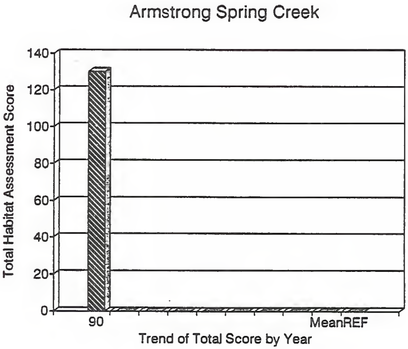
[a] From Ball 1982.
[b] From Platts et al. 1983.

Armstrong Spring Creek

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HAARMSPR

	Year	90								Mean	REF
	Month/Day	July 11									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	20									
2	Embeddedness	18									
3	Flow	20									
4	Channel alteration	15									
5	Bottom scouring and deposition	15									
6	Pool/riffle, run/bend ratio	14									
7	Bank stability	9									
8	Bank vegetation stability	10									
9	Streamside cover	9									
	TOTAL SCORE	130	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

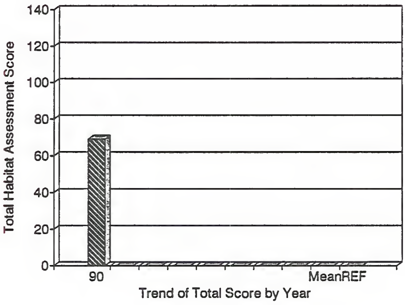


Battle Creek north of Chinook

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HABATTLE

	Year	90								Mean	REF
	Month/Day	Aug 21									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	15									
2	Embeddedness	2									
3	Flow	1									
4	Channel alteration	13									
5	Bottom scouring and deposition	8									
6	Pool/riffle, run/bend ratio	9									
7	Bank stability	7									
8	Bank vegetation stability	9									
9	Streamside cover	5									
	TOTAL SCORE	69	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

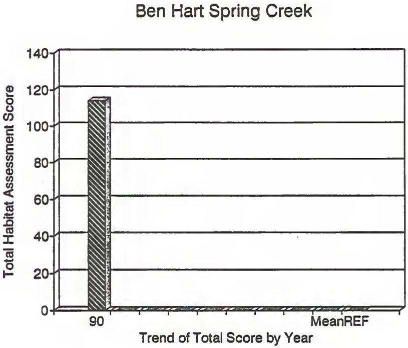

Battle Creek north of Chinook

Ben Hart Spring Creek

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HABENHAR

	Year	90								Mean	REF
	Month/Day	Jul 10									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	20									
2	Embeddedness	18									
3	Flow	15									
4	Channel alteration	13									
5	Bottom scouring and deposition	13									
6	Pool/riffle, run/bend ratio	11									
7	Bank stability	9									
8	Bank vegetation stability	10									
9	Streamside cover	5									
	TOTAL SCORE	114	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

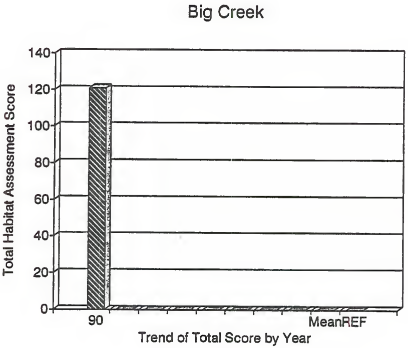


Big Creek

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HABIG

	Year	90								Mean	REF
	Month/Day	Jul 26									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	20									
2	Embeddedness	19									
3	Flow	16									
4	Channel alteration	15									
5	Bottom scouring and deposition	15									
6	Pool/riffle, run/bend ratio	10									
7	Bank stability	9									
8	Bank vegetation stability	9									
9	Streamside cover	8									
	TOTAL SCORE	121	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.



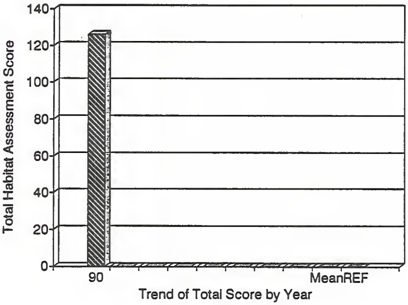
Big Hole River above hwy 43

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HABHR43

	Year	90								Mean	REF
	Month/Day	Jul 23									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	20									
2	Embeddedness	20									
3	Flow	16									
4	Channel alteration	15									
5	Bottom scouring and deposition	15									
6	Pool/riffle, run/bend ratio	13									
7	Bank stability	10									
8	Bank vegetation stability	10									
9	Streamside cover	7									
	TOTAL SCORE	126	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

Big Hole River above hwy 43

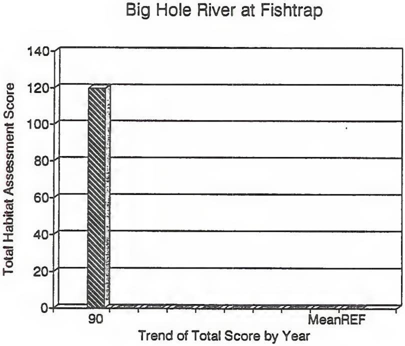


Big Hole River at Fishtrap

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HABHRFI

	Year	90								Mean	REF
	Month/Day	Jul 23									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	20									
2	Embeddedness	20									
3	Flow	15									
4	Channel alteration	15									
5	Bottom scouring and deposition	15									
6	Pool/riffle, run/bend ratio	11									
7	Bank stability	9									
8	Bank vegetation stability	9									
9	Streamside cover	6									
	TOTAL SCORE	120	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

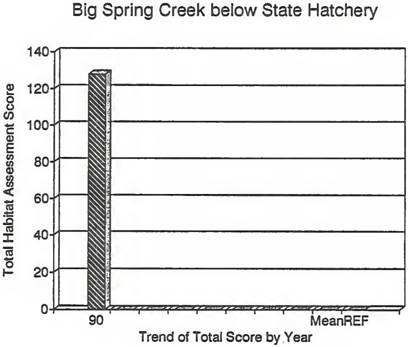


Big Spring Creek below State Hatchery

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HABSCSH

	Year	90								Mean	REF
	Month/Day	Jul 25									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	19									
2	Embeddedness	15									
3	Flow	20									
4	Channel alteration	15									
5	Bottom scouring and deposition	15									
6	Pool/riffle, run/bend ratio	15									
7	Bank stability	10									
8	Bank vegetation stability	10									
9	Streamside cover	9									
	TOTAL SCORE	128	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

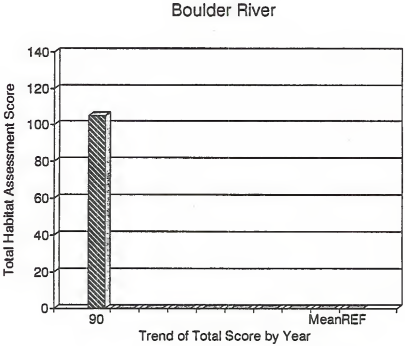


Boulder River

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HABOULD

	Year	90								Mean	REF
	Month/Day	Aug 23									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	20									
2	Embeddedness	10									
3	Flow	20									
4	Channel alteration	7									
5	Bottom scouring and deposition	11									
6	Pool/riffle, run/bend ratio	15									
7	Bank stability	7									
8	Bank vegetation stability	9									
9	Streamside cover	6									
	TOTAL SCORE	105	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

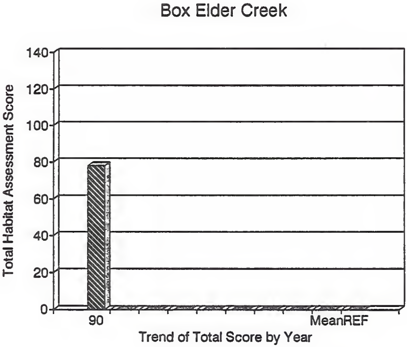


Box Elder Creek

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HABOXEL

	Year	90								Mean	REF
	Month/Day	Jul 18									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	16									
2	Embeddedness	10									
3	Flow	5									
4	Channel alteration	12									
5	Bottom scouring and deposition	10									
6	Pool/riffle, run/bend ratio	6									
7	Bank stability	7									
8	Bank vegetation stability	7									
9	Streamside cover	5									
	TOTAL SCORE	78	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

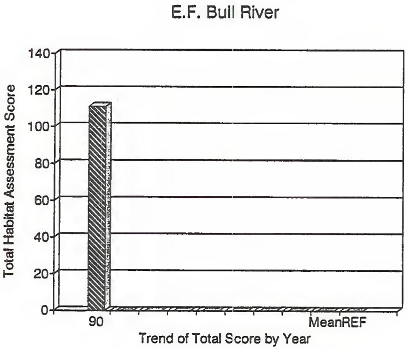


E.F. Bull River

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HAEFBULL

	Year	90								Mean	REF
	Month/Day	Sept 2									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	16									
2	Embeddedness	19									
3	Flow	15									
4	Channel alteration	11									
5	Bottom scouring and deposition	9									
6	Pool/riffle, run/bend ratio	15									
7	Bank stability	8									
8	Bank vegetation stability	8									
9	Streamside cover	10									
	TOTAL SCORE	111	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

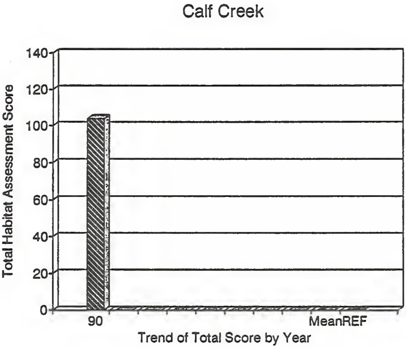


Calf Creek

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HACALF

	Year	90								Mean	REF
	Month/Day	Sept 6									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	20									
2	Embeddedness	11									
3	Flow	18									
4	Channel alteration	15									
5	Bottom scouring and deposition	11									
6	Pool/riffle, run/bend ratio	7									
7	Bank stability	7									
8	Bank vegetation stability	7									
9	Streamside cover	8									
	TOTAL SCORE	104	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

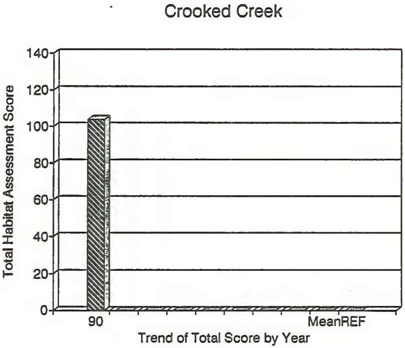


Crooked Creek

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HACROOK

	Year	90								Mean	REF
	Month/Day	Jul 16									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	18									
2	Embeddedness	5									
3	Flow	18									
4	Channel alteration	12									
5	Bottom scouring and deposition	15									
6	Pool/riffle, run/bend ratio	13									
7	Bank stability	5									
8	Bank vegetation stability	9									
9	Streamside cover	9									
	TOTAL SCORE	104	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

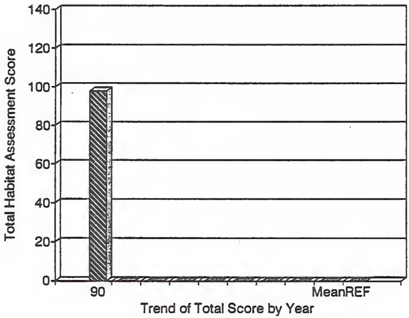


Elk Creek

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HAELK

	Year	90								Mean	REF
	Month/Day	Jul 10									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	11									
2	Embeddedness	15									
3	Flow	20									
4	Channel alteration	11									
5	Bottom scouring and deposition	11									
6	Pool/riffle, run/bend ratio	10									
7	Bank stability	3									
8	Bank vegetation stability	10									
9	Streamside cover	7									
	TOTAL SCORE	98	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.



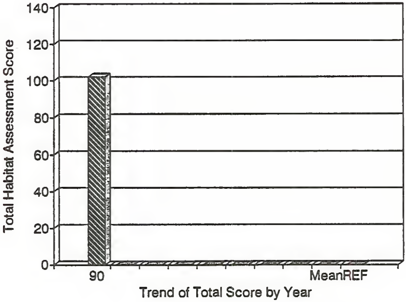
S.F. Flathead River

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HASFFLAT

	Year	90								Mean	REF
	Month/Day	Aug 31									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	14									
2	Embeddedness	20									
3	Flow	12									
4	Channel alteration	8									
5	Bottom scouring and deposition	3									
6	Pool/riffle, run/bend ratio	12									
7	Bank stability	8									
8	Bank vegetation stability	9									
9	Streamside cover	16									
	TOTAL SCORE	102	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

S.F. Flathead River

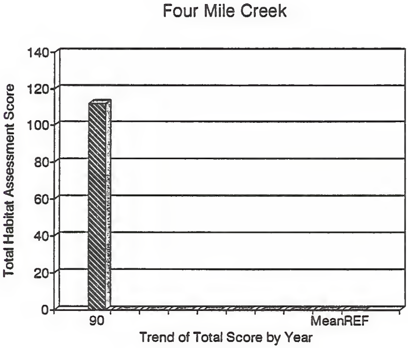


Four Mile Creek

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HAFOUR

	Year	90								Mean	REF
	Month/Day	Sep 13									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	20									
2	Embeddedness	16									
3	Flow	12									
4	Channel alteration	15									
5	Bottom scouring and deposition	15									
6	Pool/riffle, run/bend ratio	7									
7	Bank stability	10									
8	Bank vegetation stability	10									
9	Streamside cover	7									
	TOTAL SCORE	112	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

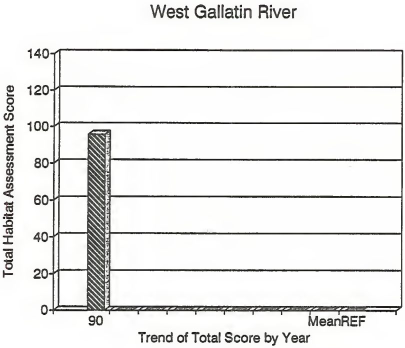


West Gallatin River

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HAWGALL

	Year	90								Mean	REF
	Month/Day	Sept 4									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	20									
2	Embeddedness	13									
3	Flow	12									
4	Channel alteration	11									
5	Bottom scouring and deposition	10									
6	Pool/riffle, run/bend ratio	7									
7	Bank stability	5									
8	Bank vegetation stability	9									
9	Streamside cover	9									
	TOTAL SCORE	96	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

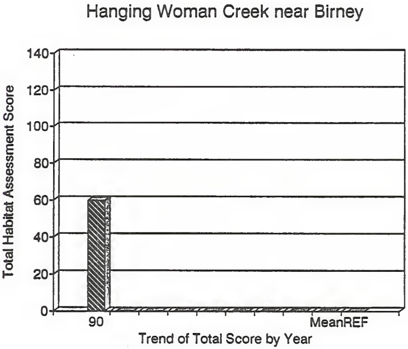


Hanging Woman Creek near Birney

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HAHANG

	Year	90								Mean	REF
	Month/Day	Jul 19									Ecore-gion ref.
	Investigator										
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	3									
2	Embeddedness	2									
3	Flow	2									
4	Channel alteration	10									
5	Bottom scouring and deposition	10									
6	Pool/riffle, run/bend ratio	9									
7	Bank stability	9									
8	Bank vegetation stability	9									
9	Streamside cover	6									
	TOTAL SCORE	60	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

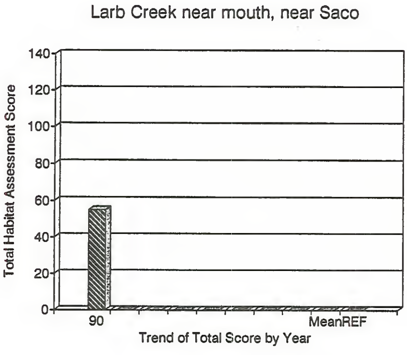


Larb Creek near mouth, near Saco

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HALARB

	Year	90								Mean	REF
	Month/Day	Jul 17									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	12									
2	Embeddedness	7									
3	Flow	2									
4	Channel alteration	1									
5	Bottom scouring and deposition	5									
6	Pool/riffle, run/bend ratio	9									
7	Bank stability	3									
8	Bank vegetation stability	7									
9	Streamside cover	9									
	TOTAL SCORE	55	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

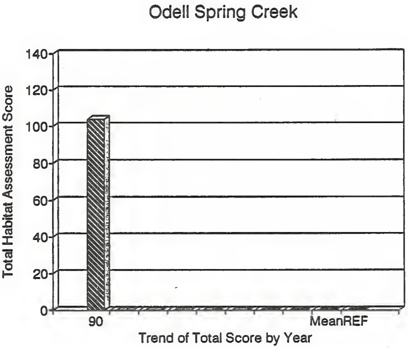


Odell Spring Creek

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HAODELL

	Year	90								Mean	REF
	Month/Day	Jul 31									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	18									
2	Embeddedness	18									
3	Flow	17									
4	Channel alteration	8									
5	Bottom scouring and deposition	8									
6	Pool/riffle, run/bend ratio	11									
7	Bank stability	7									
8	Bank vegetation stability	9									
9	Streamside cover	8									
	TOTAL SCORE	104	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.



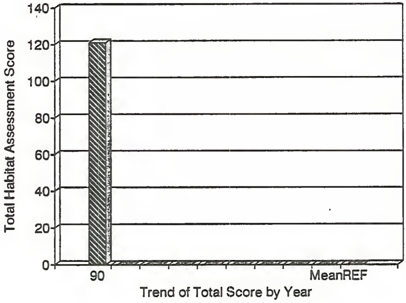
Pine Creek above Forest Service Boundary

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HAPINE

	Year	90								Mean	REF
	Month/Day	Jul 26									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	16									
2	Embeddedness	18									
3	Flow	20									
4	Channel alteration	15									
5	Bottom scouring and deposition	9									
6	Pool/riffle, run/bend ratio	15									
7	Bank stability	9									
8	Bank vegetation stability	10									
9	Streamside cover	9									
	TOTAL SCORE	121	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

Pine Creek above FS Boundary



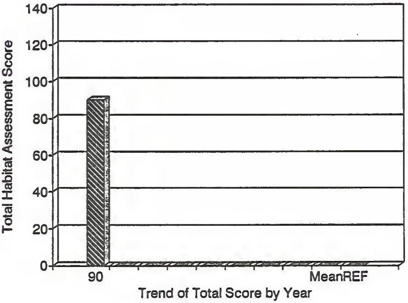
W.F. Poplar River at hwy 13

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HAWPOP13

	Year	90								Mean	REF
	Month/Day	Aug 22									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	17									
2	Embeddedness	15									
3	Flow	10									
4	Channel alteration	13									
5	Bottom scouring and deposition	8									
6	Pool/riffle, run/bend ratio	9									
7	Bank stability	6									
8	Bank vegetation stability	8									
9	Streamside cover	4									
	TOTAL SCORE	90	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

W.F. Poplar River at hwy 13



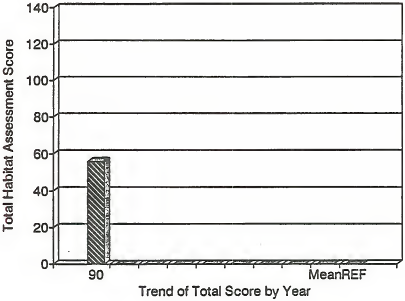
Redwater River at hwy 201

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HARED201

	Year	90								Mean	REF
	Month/Day	Aug 23									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	17									
2	Embeddedness	3									
3	Flow	1									
4	Channel alteration	8									
5	Bottom scouring and deposition	8									
6	Pool/riffle, run/bend ratio	6									
7	Bank stability	3									
8	Bank vegetation stability	6									
9	Streamside cover	4									
	TOTAL SCORE	56	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

Redwater River at hwy 201

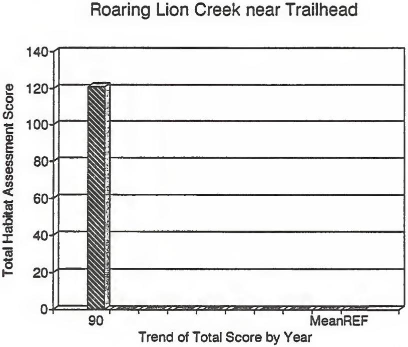


Roaring Lion Creek near Trailhead

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HAROART

	Year	90							Mean	REF
	Month/Day	Jul 27								Ecore-
	Investigator									gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	20								
2	Embeddedness	20								
3	Flow	15								
4	Channel alteration	14								
5	Bottom scouring and deposition	12								
6	Pool/riffle, run/bend ratio	13								
7	Bank stability	9								
8	Bank vegetation stability	10								
9	Streamside cover	8								
	TOTAL SCORE	121	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

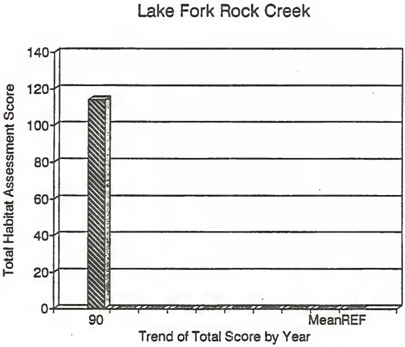


Lake Fork Rock Creek

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HALFROCK

	Year	90								Mean	REF
	Month/Day	Aug 22									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	20									
2	Embeddedness	14									
3	Flow	14									
4	Channel alteration	15									
5	Bottom scouring and deposition	15									
6	Pool/riffle, run/bend ratio	7									
7	Bank stability	10									
8	Bank vegetation stability	10									
9	Streamside cover	9									
	TOTAL SCORE	114	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

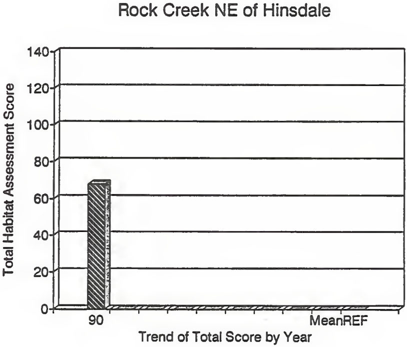


Rock Creek NE of Hinsdale

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HAROCKH

	Year	90								Mean	REF
	Month/Day	Aug 22									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	15									
2	Embeddedness	2									
3	Flow	1									
4	Channel alteration	12									
5	Bottom scouring and deposition	8									
6	Pool/riffle, run/bend ratio	8									
7	Bank stability	8									
8	Bank vegetation stability	9									
9	Streamside cover	5									
	TOTAL SCORE	68	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

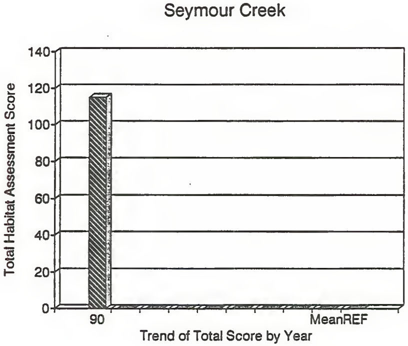


Seymour Creek

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HASEYM

	Year	90								Mean	REF
	Month/Day	Jul 26									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	20									
2	Embeddedness	18									
3	Flow	16									
4	Channel alteration	11									
5	Bottom scouring and deposition	11									
6	Pool/riffle, run/bend ratio	10									
7	Bank stability	9									
8	Bank vegetation stability	10									
9	Streamside cover	10									
	TOTAL SCORE	115	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

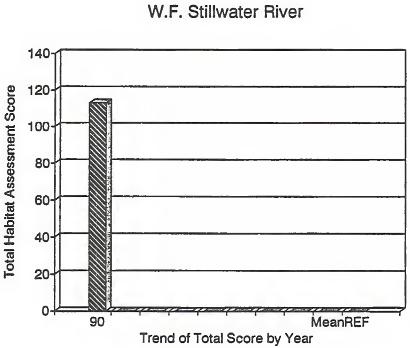


W.F. Stillwater River

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HAWFSTIL

	Year	90							Mean	REF
	Month/Day	Aug 21								Ecore-
	Investigator									gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	20								
2	Embeddedness	13								
3	Flow	18								
4	Channel alteration	11								
5	Bottom scouring and deposition	11								
6	Pool/riffle, run/bend ratio	15								
7	Bank stability	8								
8	Bank vegetation stability	10								
9	Streamside cover	7								
	TOTAL SCORE	113	0	0	0	0	0	0	0	

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

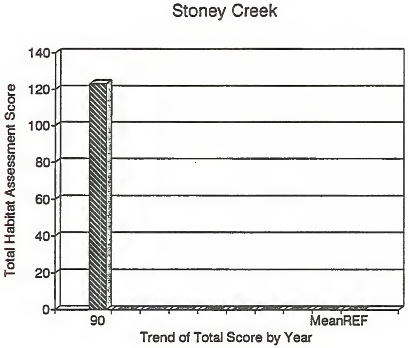


Stoney Creek

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HASTONE

	Year	90								Mean	REF
	Month/Day	Jul 30									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	20									
2	Embeddedness	20									
3	Flow	18									
4	Channel alteration	11									
5	Bottom scouring and deposition	11									
6	Pool/riffle, run/bend ratio	13									
7	Bank stability	11									
8	Bank vegetation stability	9									
9	Streamside cover	10									
	TOTAL SCORE	123	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

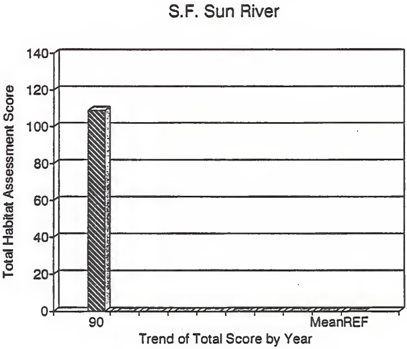


S.F. Sun River

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HASFSUN

	Year	90								Mean	REF
	Month/Day	Sep 12									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	20									
2	Embeddedness	20									
3	Flow	16									
4	Channel alteration	10									
5	Bottom scouring and deposition	11									
6	Pool/riffle, run/bend ratio	11									
7	Bank stability	8									
8	Bank vegetation stability	8									
9	Streamside cover	5									
	TOTAL SCORE	109	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

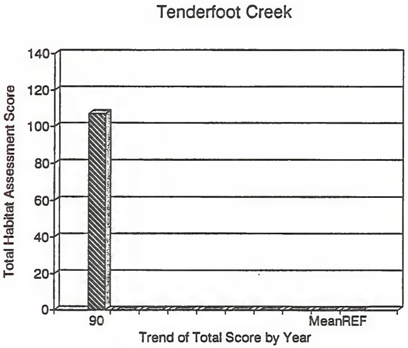


Tenderfoot Creek

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HATENDER

	Year	90								Mean	REF
	Month/Day	Sept 6									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	20									
2	Embeddedness	18									
3	Flow	12									
4	Channel alteration	12									
5	Bottom scouring and deposition	12									
6	Pool/riffle, run/bend ratio	10									
7	Bank stability	8									
8	Bank vegetation stability	9									
9	Streamside cover	6									
	TOTAL SCORE	107	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

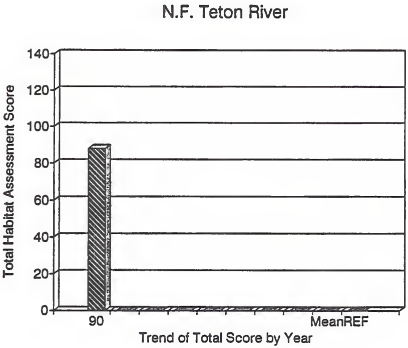


N.F. Teton River

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HANFTET

	Year	90								Mean	REF
	Month/Day	Sep 11									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	20									
2	Embeddedness	18									
3	Flow	10									
4	Channel alteration	4									
5	Bottom scouring and deposition	8									
6	Pool/riffle, run/bend ratio	7									
7	Bank stability	5									
8	Bank vegetation stability	7									
9	Streamside cover	9									
	TOTAL SCORE	88	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.



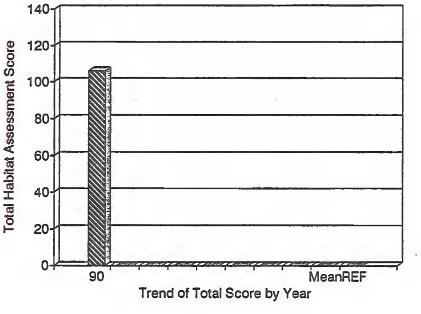
Tongue River near Pyramid Butte

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HATRPB

	Year	90								Mean	REF
	Month/Day	Jul 19									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	17									
2	Embeddedness	12									
3	Flow	16									
4	Channel alteration	13									
5	Bottom scouring and deposition	13									
6	Pool/riffle, run/bend ratio	11									
7	Bank stability	7									
8	Bank vegetation stability	9									
9	Streamside cover	8									
	TOTAL SCORE	106	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

Tongue River near Pyramid Butte

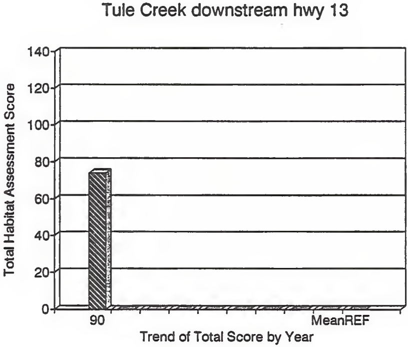


Tule Creek downstream of hwy 13

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HATULE13

	Year	90								Mean	REF
	Month/Day	Aug 23									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	12									
2	Embeddedness	2									
3	Flow	1									
4	Channel alteration	13									
5	Bottom scouring and deposition	11									
6	Pool/riffle, run/bend ratio	8									
7	Bank stability	8									
8	Bank vegetation stability	10									
9	Streamside cover	9									
	TOTAL SCORE	74	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

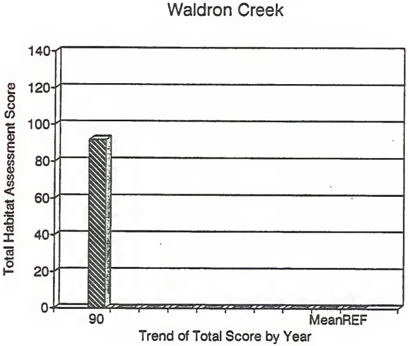


Waldron Creek

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HAWALD

	Year	90								Mean	REF
	Month/Day	Sep 11									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	16									
2	Embeddedness	10									
3	Flow	18									
4	Channel alteration	9									
5	Bottom scouring and deposition	9									
6	Pool/riffle, run/bend ratio	11									
7	Bank stability	5									
8	Bank vegetation stability	6									
9	Streamside cover	8									
	TOTAL SCORE	92	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

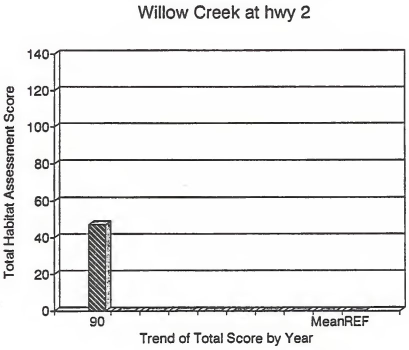


Willow Creek at hwy 2

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HAWILL2

	Year	90								Mean	REF
	Month/Day	Aug 20									Ecore-
	Investigator										gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	1									
2	Embeddedness	1									
3	Flow	1									
4	Channel alteration	12									
5	Bottom scouring and deposition	2									
6	Pool/riffle, run/bend ratio	8									
7	Bank stability	8									
8	Bank vegetation stability	9									
9	Streamside cover	5									
	TOTAL SCORE	47	0	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.

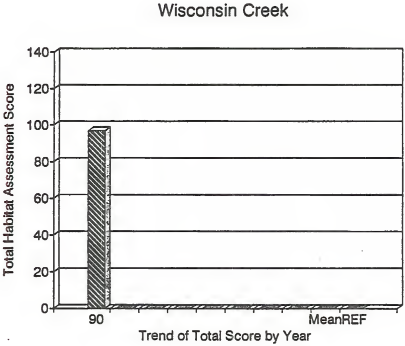


Wisconsin Creek

HABITAT ASSESSMENT SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocols
File: HAWISC

	Year	90							Mean	REF
	Month/Day	Aug 4								Ecore-
	Investigator									gion ref.
	PARAMETER	Score	Score	Score	Score	Score	Score	Score	Mean	Values
1	Bottom substrate/avail. cover	15								
2	Embeddedness	16								
3	Flow	14								
4	Channel alteration	12								
5	Bottom scouring and deposition	7								
6	Pool/riffle, run/bend ratio	11								
7	Bank stability	8								
8	Bank vegetation stability	8								
9	Streamside cover	6								
	TOTAL SCORE	97	0	0	0	0	0	0		

Scoring critera: Excellent= 111-135, Good= 75-102, Fair= 39-66, Poor= 0-30.



HABITAT SUMMARY PROTOCOL

File:HABSUPRO

The 1990 Montana Physical Characterization/Water Quality Field Data Sheet and the Biosurvey Field Data Sheet are modified from Plafkin et al. (1989). Examples of the field data sheets follow.

For the 1990 Montana Reference stream project, a file has been constructed to store and summarize information for each site. These files follow. Information from sampling in subsequent years can be appended easily.

These site files are Quattro Pro spreadsheet files. The template file is HABSUM.WQ1. The template can be easily modified as parameters and information needs change.

Using Site Files:

1. The Quattro file name is listed on each sheet for each site.
2. Enter the year and investigator at the top of the next available column.
3. Enter data or information from the field survey sheets in the appropriate cell.
4. Use the Comments space at the bottom of the second page to make record observations.
5. Mean or Ecoregion Reference columns can be easily added. Graphs can be inserted below or to the side of the spreadsheet.
6. * in a cell means that there are auxiliary comments below. T=trace.

Using the Template File:

1. Call up HABSUM.WQ1 and enter data and information as above.
2. Place the site name in row 1, and the file name in row 4.
3. Make sure you save the new site file under a new file name, so as not to overwrite the template.

The template has been pre-formatted, including the printing block. It is formatted for printing, using the print to fit function and a laser printer.

Montana, Reference Stream Project 1990

Rapid Bioassessment Protocol III
File: SITEDIR

SITE	Habitat Assessment FILE ID	Habitat Summary FILE ID
Armstrong Spring Creek	HAARMSPR	HSARMSPR
Battle Creek North of Chinook	HABATTLE	HSBATTLE
Ben Hart Spring Creek	HABENHAR	HSBENHAR
Big Creek	HABIG	HSBIG
Big Hole River above hwy 43	HABHR43	HSBHR43
Big Hole River at Fishtarp	HABHRFI	HSBHRFI
Big Spring Creek below State Hatchery	HABSCSH	HSBSCSH
Boulder River	HABOULD	HSBOULD
Box Elder Creek	HABOXEL	HSBOXEL
E.F. Bull River	HAEFBULL	HSEFBULL
Calf Creek	HACALF	HSCALF
Crooked Creek	HACROOK	HSCROOK
Elk Creek	HAELK	HSELK
S.F. Flathead River	HASFFLAT	HSSFFLAT
Four Mile Creek	HAFOUR	HSFOUR
West Gallatin River	HAWGALL	HSWGALL
Hanging Woman Creek near Birney	HAHANG	HSAHNG
Larb Creek near mouth	HALARB	HSLARB
Odell Spring Creek	HAODELL	HSODELL
Pine Creek above FS boundary	HAPINE	HSPINE
W.F. Poplar River at hwy 13	HAWPOP13	HSWPOP13
Redwater River at hwy 201	HARED201	HSRED201
Roaring Lion Creek near trailhead	HAROART	HSROART
Rock Creek NE Hinsdale	HAROCKH	HSROCKH
Lake Fork Rock Creek	HALFROCK	HSLFROCK
Seymour Creek	HASEYM	HSSEYM
W.F. Stillwater River	HAWFSTIL	HSWFSTIL
Stoney Creek	HASTONE	HSSTONE
S.F. Sun River	HASFSUN	HSSFSUN
Tenderfoot Creek	HATENDER	HSTENDER
N.F. Teton River	HANFTET	HSNFTET
Tongue River near Pyramid Butte	HATRPB	HSTRPB
Tule Creek downstream of hwy 13	HATULE13	HSTULE13
Waldron Creek	HAWALD	HSWALD
Willow Creek at hwy 2	HAWILL2	HSWILL2
Wisconsin Creek	HAWISC	HSWISC
Template File	HABASS.WQ1	HABSUM.WQ1

Tongue River nr. Pyramid Butte
7/19/90

PHYSICAL CHARACTERIZATION/WATER QUALITY
FIELD DATA SHEET

PHYSICAL CHARACTERIZATION

RIPARIAN ZONE/INSTREAM FEATURES

Forest Field/Pasture [✓ Agricultural] Residential Commerical Industrial Other range/hay
Local Watershed Erosion: None [✓ Moderate] Heavy
Local Watershed NPS Pollution: No evidence [✓ Some Potential Sources] Obvious Sources
Estimated Stream Width 2.5 m Estimated Stream Depth: Riffle .5 m Run 1 m Pool >1 m
High Water Mark .5 m Velocity 2ft/sec Dam Present: Yes X No __ Channelized: Yes __ No ✓
Canopy Cover: Open Partly Open [✓ Partly Shaded] Shaded

Tongue River near Pyramid Butte
HATRPB
HSTRPB

SEDIMENT/SUBSTRATE:

Sediment Odors: [✓ Normal] Sewage Petroleum Chemical Anaerobic None Other ____
Sediment Oils: [✓ Absent] Slight Moderate Profuse
Sediment Deposits: Sludge Sawdust Paper Fiber Sand Relict Shells Other NONE
Are the undersides of stones which are not deeply embedded black? Yes __ No X

Inorganic Substrate Components

Substrate type	Diameter	Percent Composition in sampling area
Bedrock		
Boulder	>256-mm (10 in.)	10%
Cobble	64-256-mm (2.5-10 in.)	50%
Gravel	2-64-mm (0.1-2.5 in.)	30%
Sand	0.06-2.00-mm (gritty)	5%
[✓ Silt]	.004-.06-mn	5%
Clay	<.004-mm (slick)	

Organic Substrate Components

Substrate Type	Characteristic	Percent Composition in sampling area
Detritus	Sticks, Wood, Coarse Plant Materials (CPOM)	
Muck-Mud	Black, Very Fine Organic (FPOM)	
Marl	Grey, Shell Fragments	

WATER QUALITY

Temperature 24 C Dissolved Oxygen 11.6mg/L pH 8.94 Conductivity ____ Other ____
Instrument(s) Used [illegible] D.O. kit II?, Hach One pH meter ([illegible])
Stream Type: [✓ Coldwater] X Warmwater X marginal Coldwater (B-2)
Water Odors: Normal Sewage Petroleum Chemical None Other musty (plants)
Water Surface Oils: Slick Sheen Globs Flecks [✓ None]
Turbidity: Clear [✓ Slightly Turbid] Opaque Water Color

Weather Conditions P.C., warm, showers
Number of Kick Samples: 2
Duration of Kick Samples (seconds): 30 sec. each
Photograph Number 18 19 20, 21
Approximate lengths of disturbed sections: 4

Rapid Bioassessment Protocol III
Biosurvey Field Data

RELATIVE ABUNDANCE OF AQUATIC BIOTA

Periphyton	0 1 [✓ 2] 3 4	Hydrozoa	[✓ 0] 1 2 3 4	Macroinvertebrates	0 1 2 [✓ 3] 4
Filamentous Algae	0 1 2 3 [✓ 4]	Slimes	[✓ 0] 1 2 3 4	Fish	0 1 2 [✓ 3] 4
Aquatic Moss	0 1 [✓ 2] 3 4	Porifera	[✓ 0] 1 2 3 4	Other Macrophytes	0 1 [✓ 2] 3 4

0 = Absent / Not Observed   1 = Rare   2 = Common   3 = Abundant   4 ~~5~~ = Dominant

---

THREE NUMBER SUBSTRATE EVALUATION

7 - 3 - 4

First Value = Dominant Substrate Particle Size Class (from A below)
Second Value = Degree of embeddedness (from B below)
Third Value = Dominant Embedding Material (from A below)

Class Description A		Class Description B	
1	Particulate organic matter -- detritus	1	nearly 100% embedded (heavy)
2	less than 1.5 mm in diameter (1/16 in) -- sand	2	75% embeddedness (moderate)
3	1.5 - 6.4 mm in diameter (1/16 - 1/4 in) -- coarse sand	[✓ 3]	50% embeddedness (intermediate)
[✓ 4]	6.4 - 25.4 mm in diameter (1/4 - 1 in) -- small pebble	4	25% embedded (light)
5	25.4 - 63.5 mm in diameter (1 - 2 1/2 in) large pebble	5	unembedded
6	63.5 - 127.0 mm in diameter (2 1/2 - 5 in) -- small cobble		
[✓ 7]	127.0 - 254.0 mm in diameter (6 - 10 in) -- large cobble		
8	greater than 254.0 mm in diameter (10 in) -- boulder		

Comments, Observations:

Armstrong Spring Creek

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSARMSPR

Date	Jul 11 90				
Investigator					

Riparian Zone/Instream Features

Land class	Fiel/Pas				
Local watershed erosion	none				
Local NPS pollution	no				
Estimated stream width (m)	20				
Estimated stream depth (m)					
Riffle	0.2				
Run	0.5				
Pool					
High water mark (m)	NA				
Velocity					
Dam present?	no				
Channelized?	no				
Canopy cover	open				
Other					

Sediment/Substrate

Sediment odors	normal				
Sediment oils	absent				
Sediment deposits	sand				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock					
Boulder	40				
Cobble	50				
Gravel	10				
Sand					
Silt					
Clay					
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM					
Muck-Mud					
Marl					
Other					

Water Quality/Field Measurements

Temperature (C)	12.7				
Dissolved oxygen (ppm)	14.1				
pH					
Conductivity					
Other					
Stream type	cold				
Water odors	normal				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	3				
Filamentous algae	2				
Aquatic moss	2				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	5				
Fish	4				
Other macrophytes	5				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	7				
Degree of embeddedness	4				
Dominant embedding material	5				

Comments

:1990: Fish for fee ($40/day); nice stream; many fisherman present

Battle Creek north of Chinook

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSBATTLE

Date	Aug 21 90				
Investigator					

Riparian Zone/Instream Features

Land class	F/P & Ag				
Local watershed erosion	slight				
Local NPS pollution	some				
Estimated stream width (m)	5				
Estimated stream depth (m)					
Riffle	0.1				
Run	0.3				
Pool	1				
High water mark (m)	2				
Velocity	<0.1				
Dam present?	no				
Channelized?	no				
Canopy cover	open				
Other					

Sediment/Substrate

Sediment odors	anaerobic				
Sediment oils	slight				
Sediment deposits	*				
Black undersides of rocks?	some				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	<5				
Cobble	20				
Gravel	30				
Sand	25				
Silt	15				
Clay	<5				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	30				
Muck-Mud	40				
Marl	0				
Other					

Battle Creek north of Chinook
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	24.6				
Dissolved oxygen (ppm)	8.3				
pH	8.26				
Conductivity					
Other					
Stream type	warm				
Water odors	normal				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	2				
Filamentous algae	4				
Aquatic moss	1				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	2				
Fish	3				
Other macrophytes	2				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	4				
Degree of embeddedness	2				
Dominant embedding material	2				

Comments

:1990 sediment deposits include sand, relict shells, organic deposits and silt; detritus mostly algae; water is clear, but with some organic staining; see extensive notes on 1990 field sheets.

Ben Hart Spring Creek

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSBENHAR

Date	Jul 11 90				
Investigator					

Riparian Zone/Instream Features

Land class	field/pas				
Local watershed erosion	slight				
Local NPS pollution	no				
Estimated stream width (m)					
Estimated stream depth (m)					
Riffle					
Run					
Pool					
High water mark (m)					
Velocity					
Dam present?					
Channelized?					
Canopy cover					
Other					

Sediment/Substrate

Sediment odors	normal				
Sediment oils	absent				
Sediment deposits	san				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock					
Boulder					
Cobble	10				
Gravel	85				
Sand	<5				
Silt	5				
Clay					
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM					
Muck-Mud					
Marl					
Other					

Water Quality/Field Measurements

Temperature (C)	15.5				
Dissolved oxygen (ppm)	9.8				
pH	8.3				
Conductivity					
Other					
Stream type	cold				
Water odors	none				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	2				
Filamentous algae	2				
Aquatic moss	1				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	4				
Fish	4				
Other macrophytes	4				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	5				
Degree of embeddedness	4				
Dominant embedding material	3				

Comments

Big Creek

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSBIG

Date	Jul 26 90				
Investigator					

Riparian Zone/Instream Features

Land class	forest				
Local watershed erosion	none				
Local NPS pollution	some				
Estimated stream width (m)	9				
Estimated stream depth (m)					
Riffle	0.25				
Run					
Pool	0.5				
High water mark (m)	0.5				
Velocity					
Dam present?	no				
Channelized?	no				
Canopy cover	part open				
Other					

Sediment/Substrate

Sediment odors	none				
Sediment oils	absent				
Sediment deposits	sand				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	10				
Cobble	50				
Gravel	35				
Sand	5				
Silt	T				
Clay	T				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	T				
Muck-Mud	0				
Marl	0				
Other					

Water Quality/Field Measurements

Temperature (C)	11.1				
Dissolved oxygen (ppm)	9.3				
pH	8				
Conductivity					
Other					
Stream type	cold				
Water odors	none				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	3				
Filamentous algae	2				
Aquatic moss	1				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	3				
Fish	0				
Other macrophytes	0				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	6				
Degree of embeddedness	5				
Dominant embedding material	0				

Comments

:1990 slight erosion in immediate sampling area from cow or fisherman trampling; mostly open, forested shoreline; dark green, hairlike algae in patches; also patches of green algae that resembles celophane; periphyton moderate, but substrate slippery.

Big Hole River above hwy 43

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS

Montana, Rapid Bioassessment Protocol 3

File: HSBHR43

Date	Jul 23 90				
Investigator					

Riparian Zone/Instream Features

Land class	for & F/P				
Local watershed erosion	none				
Local NPS pollution	some				
Estimated stream width (m)	35				
Estimated stream depth (m)					
Riffle	0.2				
Run	0.4				
Pool	3				
High water mark (m)					
Velocity					
Dam present?	no				
Channelized?	yes				
Canopy cover	open				
Other					

Sediment/Substrate

Sediment odors	normal				
Sediment oils	absent				
Sediment deposits	sand				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock					
Boulder					
Cobble					
Gravel					
Sand					
Silt					
Clay					
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM					
Muck-Mud					
Marl					
Other					

Big Hole River at hwy 43.
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)					
Dissolved oxygen (ppm)					
pH					
Conductivity					
Other					
Stream type	cold				
Water odors	none				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton					
Filamentous algae					
Aquatic moss					
Hydrozoa					
Slimes					
Porifera					
Macroinvertebrates					
Fish					
Other macrophytes					

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class					
Degree of embeddedness					
Dominant embedding material					

Comments

:1990 another evaluation is referred to "similar to above"
This may be Big Hole River at Fishtrap

Big Hole River at Fishtrap

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSBHRFI

Date	Jul 23 90				
Investigator					

Riparian Zone/Instream Features

Land class	for & F/P				
Local watershed erosion	none				
Local NPS pollution	some				
Estimated stream width (m)	30				
Estimated stream depth (m)					
Riffle	0.5				
Run	1				
Pool	2.5				
High water mark (m)	1				
Velocity					
Dam present?	no				
Channelized?	no				
Canopy cover					
Other					

Sediment/Substrate

Sediment odors	normal				
Sediment oils	absent				
Sediment deposits	sand				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock					
Boulder	15				
Cobble	50				
Gravel	30				
Sand	5				
Silt					
Clay					
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM					
Muck-Mud					
Marl					
Other					

Big Hole River at Fishtrap
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	18.3				
Dissolved oxygen (ppm)	12.8				
pH					
Conductivity					
Other					
Stream type	cold				
Water odors	normal				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	3				
Filamentous algae	3				
Aquatic moss	2				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	3				
Fish	3				
Other macrophytes	3				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	6				
Degree of embeddedness	4				
Dominant embedding material	5				

Comments

:1990 cows upstream; substrate variable, sampled a composite of habitats; some fines

Big Spring Creek below State Hatchery

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSBSCSH

Date	Jul 25 90				
Investigator					

Riparian Zone/Instream Features

Land class	agri/res				
Local watershed erosion	moderate				
Local NPS pollution	some				
Estimated stream width (m)	6				
Estimated stream depth (m)					
Riffle	0.1				
Run	1				
Pool	2				
High water mark (m)	NA				
Velocity					
Dam present?	no				
Channelized?	no				
Canopy cover	open				
Other					

Sediment/Substrate

Sediment odors	normal				
Sediment oils	absent				
Sediment deposits	sand				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	10				
Cobble	50				
Gravel	10				
Sand	20				
Silt	10				
Clay	0				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM					
Muck-Mud					
Marl	present				
Other					

Big Spring Creek below State Hatchery
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	12				
Dissolved oxygen (ppm)	12.2				
pH	8.13				
Conductivity					
Other					
Stream type	cold				
Water odors	normal				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	3				
Filamentous algae	0				
Aquatic moss	0				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	3				
Fish	2				
Other macrophytes	3				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	6				
Degree of embeddedness	3				
Dominant embedding material	2				

Comments

Boulder River

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSBOULD

Date	Aug 23 90				
Investigator					

Riparian Zone/Instream Features

Land class	forest				
Local watershed erosion	moderate				
Local NPS pollution	some				
Estimated stream width (m)	9				
Estimated stream depth (m)					
Riffle	0.3				
Run	0.4				
Pool	2.5				
High water mark (m)	0.6				
Velocity					
Dam present?	no				
Channelized?	no				
Canopy cover	part shade				
Other					

Sediment/Substrate

Sediment odors	normal				
Sediment oils	absent				
Sediment deposits	sand/silt				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	10				
Cobble	40				
Gravel	43				
Sand	5				
Silt	2				
Clay	T				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	T				
Muck-Mud	0				
Marl	0				
Other					

Boulder River
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	8				
Dissolved oxygen (ppm)	9.65				
pH	7.65				
Conductivity					
Other					
Stream type	cold				
Water odors	normal				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	1				
Filamentous algae	2				
Aquatic moss	0				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	2				
Fish	0				
Other macrophytes	0				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	6				
Degree of embeddedness	3				
Dominant embedding material	4				

Comments

:1990 campgrounds & trails present; 60 cfs

Box Elder Creek

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSBOXEL

Date	Jul 18 90				
Investigator					

Riparian Zone/Instream Features

Land class	pasture				
Local watershed erosion	moderate				
Local NPS pollution	some				
Estimated stream width (m)	15				
Estimated stream depth (m)					
Riffle	0.1				
Run	0.5				
Pool	1				
High water mark (m)					
Velocity					
Dam present?	no				
Channelized?	no				
Canopy cover	open				
Other					

Sediment/Substrate

Sediment odors	*				
Sediment oils	absent				
Sediment deposits					
Black undersides of rocks?	yes				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	5				
Cobble	15				
Gravel	25				
Sand	25				
Silt	15				
Clay	5				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	0				
Muck-Mud	10				
Marl	0				
Other					

Water Quality/Field Measurements

Temperature (C)	26				
Dissolved oxygen (ppm)	9.1				
pH	8.77				
Conductivity					
Other					
Stream type	warm				
Water odors	normal				
Water surface oils	none				
Turbidity	slight				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	3				
Filamentous algae	2				
Aquatic moss	0				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	2				
Fish	2				
Other macrophytes	3				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	5				
Degree of embeddedness	2				
Dominant embedding material	3				

Comments

:1990 no flow in pools; black muck near shore=anaerobic; riparian mostly bullrush, grass, sweetclover with some shrubs & trees; water turbid

E.F. Bull River

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSEFBULL

Date	Sept 2 90				
Investigator					

Riparian Zone/Instream Features

Land class	forest				
Local watershed erosion	none				
Local NPS pollution	none				
Estimated stream width (m)	6				
Estimated stream depth (m)					
Riffle	0.2				
Run	0.3				
Pool	0.5				
High water mark (m)	?				
Velocity					
Dam present?	no				
Channelized?	no				
Canopy cover	shaded				
Other					

Sediment/Substrate

Sediment odors	normal				
Sediment oils	absent				
Sediment deposits	sand/silt				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	3				
Boulder	25				
Cobble	35				
Gravel	20				
Sand	7				
Silt	3				
Clay	1				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	5				
Muck-Mud	1				
Marl	0				
Other					

E.F. Bull River
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	10				
Dissolved oxygen (ppm)	10.5				
pH					
Conductivity					
Other					
Stream type	cold				
Water odors	normal				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	1				
Filamentous algae	0				
Aquatic moss	1				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	2				
Fish	0				
Other macrophytes	0				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	7				
Degree of embeddedness	4				
Dominant embedding material	4				

Comments

:1990 campground trail and backcountry trail cross stream; detritus=logs; large boulders intermixed with cobble/gravel; gradient >3%; pools formed by log steps; oldgrowth cedar-hemlock; sparse understory; channel scored heavily during high flow; ca. 30 cfs.

Calf Creek

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSCALF

Date	Sept 6 90				
Investigator					

Riparian Zone/Instream Features

Land class	for & F/P				
Local watershed erosion	moderate				
Local NPS pollution	some				
Estimated stream width (m)	2.5				
Estimated stream depth (m)					
Riffle	0.1				
Run	0.3				
Pool	0.45				
High water mark (m)	0.3				
Velocity					
Dam present?					
Channelized?					
Canopy cover	part shade				
Other					

Sediment/Substrate

Sediment odors	normal				
Sediment oils	absent				
Sediment deposits	silt				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	25				
Cobble	25				
Gravel	40				
Sand	8				
Silt	2				
Clay	0				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	10				
Muck-Mud	1				
Marl	0				
Other					

Calf Creek
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	13.9				
Dissolved oxygen (ppm)	8.9				
pH	8.32				
Conductivity					
Other					
Stream type	cold				
Water odors	normal				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	2				
Filamentous algae	1				
Aquatic moss	0				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	2				
Fish	2				
Other macrophytes	0				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	8				
Degree of embeddedness	3				
Dominant embedding material	4				

Comments

:1990 definite grazing impacts; 50/50 forest & field/pasture; 50/50 shade & open;
obviuos grazing impacts on banks & riparian area; high amount of CPOM, leaf & branch.

Crooked River

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSCROOK

Date	Jul 10 90				
Investigator					

Riparian Zone/Instream Features

Land class	field/pas				
Local watershed erosion	moderate				
Local NPS pollution	obvious				
Estimated stream width (m)	3				
Estimated stream depth (m)					
Riffle	0.1				
Run	0.35				
Pool	0.9				
High water mark (m)	0.9				
Velocity					
Dam present?	no				
Channelized?	no				
Canopy cover	part shade				
Other					

Sediment/Substrate

Sediment odors	normal				
Sediment oils	absent				
Sediment deposits	silt				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	5				
Cobble	35				
Gravel	50				
Sand	6				
Silt	2				
Clay	2				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	2				
Muck-Mud					
Marl	*				
Other					

Water Quality/Field Measurements

Temperature (C)	13.9				
Dissolved oxygen (ppm)	9.8				
pH	8.9				
Conductivity					
Other					
Stream type	cold				
Water odors	normal				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	0				
Filamentous algae	0				
Aquatic moss	2				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	2				
Fish	1				
Other macrophytes	0				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	6				
Degree of embeddedness	2				
Dominant embedding material	2				

Comments

:1990 cattle grazing + erosive soils= obvious NPS pollution; red silt present; calcareous marl on many rocks, but not heavy; embeddedness is the real constraint here; after leaving the canyon, stream flows through some sandstone & red shale beds; embeddedness is largely natural, but some grazing impacts on banks obvious; grazing throughout drainage & logging in headwaters.

Elk Creek

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSELK

Date	Jul 10 90				
Investigator					

Riparian Zone/Instream Features

Land class	field/pas				
Local watershed erosion	moderate				
Local NPS pollution	obvious				
Estimated stream width (m)	2.5				
Estimated stream depth (m)					
Riffle	0.1				
Run	0.3				
Pool	0.7				
High water mark (m)	NA				
Velocity					
Dam present?	no				
Channelized?	no				
Canopy cover	partly open				
Other					

Sediment/Substrate

Sediment odors	normal				
Sediment oils	absent				
Sediment deposits	sand				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	0				
Cobble	30				
Gravel	40				
Sand	30				
Silt	0				
Clay	0				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM					
Muck-Mud					
Marl					
Other					

Elk Creek
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	24.5				
Dissolved oxygen (ppm)	9.1				
pH	8.2				
Conductivity					
Other					
Stream type	cold				
Water odors	normal				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	5				
Filamentous algae					
Aquatic moss	2				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	4				
Fish	2				
Other macrophytes	2				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	5				
Degree of embeddedness	4				
Dominant embedding material	3				

Comments

:1990 ca. 2 cfs; sampled ca. 1 mile upstream of ranch bldgs.; this appears markedly degraded compared to last year.

S.F. Flathead River

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSSFFLAT

Date	Aug 31 90				
Investigator					

Riparian Zone/Instream Features

Land class	forest				
Local watershed erosion	none				
Local NPS pollution	no*				
Estimated stream width (m)	15				
Estimated stream depth (m)					
Riffle	0.4				
Run	NA				
Pool	1.2				
High water mark (m)					
Velocity					
Dam present?	no				
Channelized?	no*				
Canopy cover	part open*				
Other					

Sediment/Substrate

Sediment odors	none				
Sediment oils	absent				
Sediment deposits	sand*				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	5				
Boulder	15				
Cobble	40				
Gravel	35				
Sand	5				
Silt	T				
Clay	0				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	0				
Muck-Mud	0				
Marl	0				
Other					

Water Quality/Field Measurements

Temperature (C)	13.3				
Dissolved oxygen (ppm)	10.1				
pH					
Conductivity					
Other					
Stream type	cold				
Water odors	normal				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	1				
Filamentous algae	1				
Aquatic moss	0				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	2				
Fish	1				
Other macrophytes	0				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	6				
Degree of embeddedness	5				
Dominant embedding material	3				

Comments

:1990 horse trails and campgrounds present; canyons above & below sample site; at low flow the channel is more open, little veg. cover; trees higher on bank & valley walls provide AM & PM shade; wetted channel now ca. 50% bankful; high flows scour this reach; very little organic matter present; bank veg.= mature DF CW PP WL & shrubs; riparian veg. minimal & most on left bank.

Four Mile Creek

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSFOUR

Date	Sep 13 90				
Investigator					

Riparian Zone/Instream Features

Land class	forest				
Local watershed erosion	none				
Local NPS pollution	none				
Estimated stream width (m)	6				
Estimated stream depth (m)					
Riffle	0.1				
Run					
Pool	0.6				
High water mark (m)	0.9				
Velocity					
Dam present?	no				
Channelized?	no				
Canopy cover	most shad				
Other					

Sediment/Substrate

Sediment odors	normal				
Sediment oils	absent				
Sediment deposits	sand				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	60				
Cobble	25				
Gravel	10				
Sand	5				
Silt	T				
Clay	T				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	5				
Muck-Mud	0				
Marl	0				
Other					

Four Mile Creek
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	9				
Dissolved oxygen (ppm)	9.4				
pH	7.93				
Conductivity					
Other					
Stream type	cold				
Water odors	normal				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	2				
Filamentous algae	1				
Aquatic moss	2				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	2				
Fish	0				
Other macrophytes	1				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	8				
Degree of embeddedness	4				
Dominant embedding material	6				

Comments

:1990 a liitle sand; water clear; substrate clean; area downstream of bridge impacted by campers, fisherman, etc.

West Gallatin River

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSWGALL

Date	Sep 14 90				
Investigator					

Riparian Zone/Instream Features

Land class	forest				
Local watershed erosion	moderate				
Local NPS pollution	some				
Estimated stream width (m)	18				
Estimated stream depth (m)					
Riffle	0.45				
Run	0.7				
Pool	1				
High water mark (m)	1				
Velocity					
Dam present?	no				
Channelized?	yes				
Canopy cover	most open				
Other					

Sediment/Substrate

Sediment odors	normal				
Sediment oils	absent				
Sediment deposits	sand				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	15				
Cobble	60				
Gravel	20				
Sand	5				
Silt	T				
Clay	T				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	T				
Muck-Mud	0				
Marl	0				
Other					

West Gallatin River
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	8.7				
Dissolved oxygen (ppm)	9.7				
pH	8.23				
Conductivity					
Other					
Stream type	cold				
Water odors	normal				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	2				
Filamentous algae	1				
Aquatic moss	0				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	2				
Fish	1				
Other macrophytes	0				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	7				
Degree of embeddedness	3				
Dominant embedding material	4				

Comments

:1990 logging, grazing & recreational use contibute to erosion; channelized some by hwy;

Hanging Woman Creek near Birney

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSHANG

Date	Jul 17 90				
Investigator					

Riparian Zone/Instream Features

Land class	field/pas				
Local watershed erosion	moderate				
Local NPS pollution	some				
Estimated stream width (m)	5				
Estimated stream depth (m)					
Riffle					
Run	0.5				
Pool	>1				
High water mark (m)					
Velocity					
Dam present?	yes				
Channelized?	no				
Canopy cover	part shade				
Other					

Sediment/Substrate

Sediment odors	anaerobic				
Sediment oils	absent				
Sediment deposits	black muc				
Black undersides of rocks?	yes				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	0				
Cobble	5				
Gravel	5				
Sand	5				
Silt	25				
Clay	20				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	0				
Muck-Mud	40				
Marl	0				
Other					

Hanging Woman Creek near Birney
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	23.5				
Dissolved oxygen (ppm)	9.4				
pH	8.26				
Conductivity					
Other					
Stream type	warm				
Water odors	normal				
Water surface oils	none				
Turbidity	turbid				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	2				
Filamentous algae	3				
Aquatic moss	0				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	2				
Fish	2				
Other macrophytes	4				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	4				
Degree of embeddedness	1				
Dominant embedding material	2				

Comments

:1990 horse pasture at sampling site; dam just upstream; bottom has npot been scoured for at least 12 years; gravel is probably the dominant substrate, but it is completely buried under silt and organic muck; <1 cfs now; trampling of banks & stream bottom by cattle high; creek dry in 1989 except for large pools; last flood in 1978; beaver dam below sample site;

Larb Creek near mouth, near Saco

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSLARB

Date	Jul 17 90				
Investigator					

Riparian Zone/Instream Features

Land class	agri				
Local watershed erosion	moderate				
Local NPS pollution	some				
Estimated stream width (m)	10				
Estimated stream depth (m)					
Riffle	NA				
Run	NA				
Pool	1.5				
High water mark (m)					
Velocity					
Dam present?	yes				
Channelized?	no				
Canopy cover	open				
Other					

Sediment/Substrate

Sediment odors	anaerobic				
Sediment oils	absent				
Sediment deposits	detritus				
Black undersides of rocks?	yes				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	30				
Cobble	10				
Gravel	0				
Sand	5				
Silt	5				
Clay	0				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	10				
Muck-Mud	40				
Marl					
Other					

Larb Creek
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	23				
Dissolved oxygen (ppm)	9.3				
pH	8.87				
Conductivity					
Other					
Stream type	warm				
Water odors	normal				
Water surface oils	none				
Turbidity	turbid				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	2				
Filamentous algae	4				
Aquatic moss	1				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	3				
Fish	3				
Other macrophytes	3				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	8				
Degree of embeddedness	2				
Dominant embedding material	2				

Comments

:1990 away from riprap near bridge, the substrate would be 1-1-1; several small dams upstream; no flow now; locals say only flows during snow melt and after thunderstorms; drains south to north, from bentonite shale badlands to Missouri R. breaks;

Odell Spring Creek

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSODELL

Date	Jul 31 90				
Investigator					

Riparian Zone/Instream Features

Land class	field/pas				
Local watershed erosion	none				
Local NPS pollution	no				
Estimated stream width (m)	7				
Estimated stream depth (m)					
Riffle	0.1				
Run	0.8				
Pool	2				
High water mark (m)					
Velocity					
Dam present?	no				
Channelized?	no				
Canopy cover	open				
Other					

Sediment/Substrate

Sediment odors	normal				
Sediment oils	absent				
Sediment deposits	sand				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	10				
Cobble	80				
Gravel	3				
Sand	3				
Silt	3				
Clay	0				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM					
Muck-Mud					
Marl					
Other					

Odell Spring Creek
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	14.5				
Dissolved oxygen (ppm)	12.4				
pH	8.45				
Conductivity					
Other					
Stream type	cold				
Water odors	normal				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	2				
Filamentous algae	1				
Aquatic moss	0				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates					
Fish	2				
Other macrophytes	2				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	6				
Degree of embeddedness	3				
Dominant embedding material	5				

Comments

:1990 likely to be heavily flushed on occasion by Madison overflow; see other notes on field sheet.

O'Fallon Creek at hwy 12

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSOFALL

Date	Jul 18 90				
Investigator					

Riparian Zone/Instream Features

Land class	pasture				
Local watershed erosion	moderate				
Local NPS pollution	some				
Estimated stream width (m)	6				
Estimated stream depth (m)					
Riffle					
Run					
Pool	0.5				
High water mark (m)					
Velocity	0				
Dam present?	no				
Channelized?	no				
Canopy cover	open				
Other					

Sediment/Substrate

Sediment odors	normal*				
Sediment oils	absent				
Sediment deposits	sand				
Black undersides of rocks?	yes				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	5				
Boulder	5				
Cobble	15				
Gravel	20				
Sand	25				
Silt	20				
Clay	5				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	5				
Muck-Mud	5				
Marl					
Other					

O'Fallon Creek at hwy 12.
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	24				
Dissolved oxygen (ppm)	8.1				
pH	8.8				
Conductivity					
Other					
Stream type	warm				
Water odors	normal				
Water surface oils	none				
Turbidity	turbid				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=

Periphyton	2				
Filamentous algae	3				
Aquatic moss	0				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	2				
Fish	2				
Other macrophytes	3				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	5				
Degree of embeddedness	2				
Dominant embedding material	2				

Comments

:1990 no surface flow now; local says normally flows year round; last 10-12 years have been dry; gravel deposit & coal seam at site; headwaters in Chalk Buttes near Ekalaka.

Pine Creek above FS boundary

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSPINE

Date	Jul 26 90				
Investigator					

Riparian Zone/Instream Features

Land class	forest				
Local watershed erosion	moderate				
Local NPS pollution	some				
Estimated stream width (m)	2				
Estimated stream depth (m)					
Riffle	0.1				
Run	0.1				
Pool	0.25				
High water mark (m)	0.2				
Velocity					
Dam present?	no				
Channelized?	no				
Canopy cover	most shad				
Other					

Sediment/Substrate

Sediment odors	none				
Sediment oils	absent				
Sediment deposits	sand				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	5				
Cobble	40				
Gravel	40				
Sand	15				
Silt	T				
Clay	T				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	7.5				
Muck-Mud	0				
Marl	0				
Other					

Pine Creek
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	7				
Dissolved oxygen (ppm)	9.8				
pH	7.72				
Conductivity					
Other					
Stream type	cold				
Water odors	none				
Water surface oils	none				
Turbidity	slight*				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	1				
Filamentous algae	0				
Aquatic moss	4				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	3				
Fish	0				
Other macrophytes	0				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	6				
Degree of embeddedness	2				
Dominant embedding material	2				

Comments

:1990 evidence of erosion could be natural; old logging scars just upstream;tight surface armor; overnight rains may have caused slight turbidity; ca. 50% coverage by moss.

W.F. Poplar River at hwy 13

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSWPOP13

Date	Aug 22 90				
Investigator					

Riparian Zone/Instream Features

Land class	field/pas				
Local watershed erosion	moderate				
Local NPS pollution	obvious				
Estimated stream width (m)					
Estimated stream depth (m)					
Riffle	0.2				
Run	0.3				
Pool	1.5				
High water mark (m)	1				
Velocity					
Dam present?	no				
Channelized?	no				
Canopy cover	open				
Other					

Sediment/Substrate

Sediment odors	anaerobic				
Sediment oils	slight				
Sediment deposits	sand				
Black undersides of rocks?	yes*				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	<1				
Cobble	30				
Gravel	30				
Sand	20				
Silt	10				
Clay	10				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	20				
Muck-Mud	30				
Marl	20				
Other					

W.F. Poplar River at Hwy 13
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	23				
Dissolved oxygen (ppm)	8.45				
pH	8.66				
Conductivity					
Other					
Stream type	warm				
Water odors	normal				
Water surface oils	none				
Turbidity	opague				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	3				
Filamentous algae	2				
Aquatic moss	1				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	3				
Fish	3				
Other macrophytes	3				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	5				
Degree of embeddedness	4				
Dominant embedding material	2				

Comments

:1990 rocks in pools with black undersides; rocks with heavy encrustation of diatoms or CaCO3; riffles relatively clean; pools heavily embedded; very turbid; probably grazed at site; see notes on field data sheet.

Redwater River at hwy 201

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSRED201

Date	Aug 23 90				
Investigator					

Riparian Zone/Instream Features

Land class	field/pas				
Local watershed erosion	heavy				
Local NPS pollution	obvious				
Estimated stream width (m)	:1-20				
Estimated stream depth (m)					
Riffle	<0.1				
Run	0.3				
Pool	<1-3+				
High water mark (m)	:1-2				
Velocity	<0.1 m/se				
Dam present?	no				
Channelized?	no				
Canopy cover	open				
Other					

Sediment/Substrate

Sediment odors	anaerobic				
Sediment oils					
Sediment deposits	*				
Black undersides of rocks?	yes*				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	<1				
Cobble	25				
Gravel	40				
Sand	20				
Silt	10				
Clay	5				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	20				
Muck-Mud	30				
Marl	*				
Other					

Redwater River at hey 201
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	21.3				
Dissolved oxygen (ppm)	8.45				
pH	8.24				
Conductivity					
Other					
Stream type	warm				
Water odors	normal				
Water surface oils	sheen				
Turbidity	*				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	3				
Filamentous algae	2				
Aquatic moss	1				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	3				
Fish	3				
Other macrophytes	3				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	5				
Degree of embeddedness	2				
Dominant embedding material	2				

Comments

:1990 undersides of rocks black in pools and riffles; heavy (?diatom) encrustation on some rocks; sheen of ?oils in backwater seeps; opaque in most area, but clear in pools?;
nearly dry now, with standing, isolated pools, some very large and deep; groundwater seeps ca. halfmile below hwy 201 bridge; substantial erosion throughout watershed; most upper banks bare; nearshore banks usu. well vegetated; see sampling & other notes on field sheets.

Roaring Lion Creek near trailhead

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSROART

Date	Jul 27 90				
Investigator					

Riparian Zone/Instream Features

Land class	forest				
Local watershed erosion	none				
Local NPS pollution	no				
Estimated stream width (m)	10				
Estimated stream depth (m)					
Riffle	0.3				
Run	NA				
Pool	0.45				
High water mark (m)	0.6				
Velocity	ca. 3fps				
Dam present?	no				
Channelized?	no				
Canopy cover	part shade				
Other					

Sediment/Substrate

Sediment odors	normal				
Sediment oils	absent				
Sediment deposits	sand				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	60				
Cobble	25				
Gravel	?				
Sand	5				
Silt	T				
Clay	0				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	T				
Muck-Mud	0				
Marl	0				
Other					

Roaring Lion Creek
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	12.2				
Dissolved oxygen (ppm)	9.5				
pH					
Conductivity					
Other					
Stream type	cold				
Water odors	none				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton					
Filamentous algae	1				
Aquatic moss	?				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	?				
Fish	1				
Other macrophytes					

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	8				
Degree of embeddedness	5				
Dominant embedding material	2				

Comments

:1990 rated for sample site only, e.g. pool downstream with more fine sand; gravel very limited; general pool/riffle sequencing; boulder dominat; gradient ca. 5%; pools formed by boulder clusters; fish spawning & rearing hab. limited.

Lake Fork Rock Creek

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSLFROCK

Date	Aug 22 90				
Investigator					

Riparian Zone/Instream Features

Land class	forest				
Local watershed erosion	none				
Local NPS pollution	some				
Estimated stream width (m)	6				
Estimated stream depth (m)					
Riffle	0.6				
Run	0.6				
Pool	0.6				
High water mark (m)	0.6				
Velocity	:4-5 fps				
Dam present?	no				
Channelized?	no				
Canopy cover	part open				
Other					

Sediment/Substrate

Sediment odors	normal				
Sediment oils	absent				
Sediment deposits	sand				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	25				
Cobble	40				
Gravel	33				
Sand	2				
Silt	T				
Clay	T				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	2				
Muck-Mud	0				
Marl	0				
Other					

Lake Fork Rock Creek
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	9.1				
Dissolved oxygen (ppm)	8.6				
pH	7.76				
Conductivity					
Other					
Stream type	cold				
Water odors	nomal				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	1				
Filamentous algae	1				
Aquatic moss	0				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	2				
Fish	0				
Other macrophytes	0				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	8				
Degree of embeddedness	4				
Dominant embedding material	5				

Comments

:1990 ca. 100 cfs

Rock Creek NE of Hinsdale

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSROCKH

Date	Aug 22 90				
Investigator					

Riparian Zone/Instream Features

Land class	fie/pas/agr				
Local watershed erosion	slight				
Local NPS pollution	some				
Estimated stream width (m)	<1-10				
Estimated stream depth (m)					
Riffle	0.1				
Run	0.3				
Pool	1				
High water mark (m)	ca. 1-2				
Velocity	<0.1 m/se				
Dam present?	no				
Channelized?	no				
Canopy cover	open				
Other					

Sediment/Substrate

Sediment odors	anaerobic				
Sediment oils	slight				
Sediment deposits	clay/omat				
Black undersides of rocks?	yes				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	<1				
Cobble	10				
Gravel	50				
Sand	10				
Silt	10				
Clay	20				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	50				
Muck-Mud	80				
Marl	0				
Other					

Water Quality/Field Measurements

Temperature (C)	21				
Dissolved oxygen (ppm)	7.5				
pH	8.81				
Conductivity					
Other					
Stream type	warm				
Water odors	none				
Water surface oils	none				
Turbidity	moderate				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	3				
Filamentous algae	3				
Aquatic moss	1				
Hydrozoa					
Slimes	0				
Porifera	0				
Macroinvertebrates	3				
Fish	3				
Other macrophytes	3				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	4				
Degree of embeddedness	2				
Dominant embedding material	1				

Comments

:1990 an unusual stream; habitat dominated by pools with emergent catail; pool bottoms= muck overlain by detritus, reeds, cattails, other macrophytes, algae & diatoms; between pools are narrow, constricted riffles, which will be runs at high flow; turbid in larger pools (?wind); organic staining present; see other notes on field sheet.

Seymour Creek

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSSEYM

Date	Jul 26 90				
Investigator					

Riparian Zone/Instream Features

Land class	forest				
Local watershed erosion	none				
Local NPS pollution	no				
Estimated stream width (m)	3				
Estimated stream depth (m)					
Riffle	0.1				
Run	0.2				
Pool	0.5				
High water mark (m)					
Velocity	ca. 2.5 fps				
Dam present?	no				
Channelized?	no				
Canopy cover	part shade				
Other					

Sediment/Substrate

Sediment odors	none				
Sediment oils	absent				
Sediment deposits	sand				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	10				
Boulder	15				
Cobble	50				
Gravel	8				
Sand	15				
Silt	1				
Clay	0				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	1				
Muck-Mud	0				
Marl	0				
Other					

Seymour Creek
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	6.7				
Dissolved oxygen (ppm)	9.4				
pH	8.28				
Conductivity					
Other					
Stream type	cold				
Water odors	normal				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	2				
Filamentous algae	0				
Aquatic moss	2				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	2				
Fish	1				
Other macrophytes	0				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	6				
Degree of embeddedness	4				
Dominant embedding material	3				

Comments

:1990 campground present

W.F. Stillwater River

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS

Montana, Rapid Bioassessment Protocol 3

File: HSWFSTIL

Date	Aug 21 90				
Investigator					

Riparian Zone/Instream Features

Land class	forest				
Local watershed erosion	none				
Local NPS pollution	no				
Estimated stream width (m)	7.5				
Estimated stream depth (m)					
Riffle	0.1				
Run	0.4				
Pool	0.9				
High water mark (m)	0.7				
Velocity	:2-2.5 fps				
Dam present?	no				
Channelized?	no				
Canopy cover	part open				
Other					

Sediment/Substrate

Sediment odors	normal				
Sediment oils	absent				
Sediment deposits	sand				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	5				
Cobble	20				
Gravel	70				
Sand	5				
Silt	T				
Clay	T				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	T				
Muck-Mud	0				
Marl	0				
Other					

W.F. Stillwater River
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	11.2				
Dissolved oxygen (ppm)	6.4				
pH	7.85				
Conductivity					
Other					
Stream type	cold				
Water odors	normal				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	1				
Filamentous algae	0				
Aquatic moss	0				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	2				
Fish	1				
Other macrophytes	0				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	5				
Degree of embeddedness	2				
Dominant embedding material	4				

Comments

Stoney Creek

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSSTONE

Date	Jul 30 90				
Investigator					

Riparian Zone/Instream Features

Land class	forest				
Local watershed erosion	none				
Local NPS pollution	some				
Estimated stream width (m)	4.5				
Estimated stream depth (m)					
Riffle	0.1				
Run	0.1				
Pool	0.4				
High water mark (m)	0.25				
Velocity	:1.5 fps				
Dam present?	no				
Channelized?	no				
Canopy cover	part shade				
Other					

Sediment/Substrate

Sediment odors	none				
Sediment oils	absent				
Sediment deposits	silt				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	5				
Boulder	15				
Cobble	35				
Gravel	35				
Sand	2				
Silt	3				
Clay	0				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	5				
Muck-Mud	0				
Marl	0				
Other					

Stoney Creek
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	8.9				
Dissolved oxygen (ppm)	9.7				
pH					
Conductivity					
Other					
Stream type	cold				
Water odors	none				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	2				
Filamentous algae	0				
Aquatic moss	4				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	4				
Fish	0				
Other macrophytes	1				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	6				
Degree of embeddedness	4				
Dominant embedding material	3				

Comments

:1990 minor siltation; forest canopy mix of mature spruce & fir; second growth;
understory veg. sparse; lots of bugs; primarily riffle, with some drop pools & pocket water;
ca. 12 cfs.

S.F. Sun River

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSSFSUN

Date	Sep 12 90				
Investigator					

Riparian Zone/Instream Features

Land class	forest				
Local watershed erosion	none				
Local NPS pollution	none				
Estimated stream width (m)	7.5				
Estimated stream depth (m)					
Riffle	0.2				
Run	0.3				
Pool	0.7				
High water mark (m)	?				
Velocity	:2fps				
Dam present?	no				
Channelized?	no				
Canopy cover	open				
Other					

Sediment/Substrate

Sediment odors	none				
Sediment oils	absent				
Sediment deposits	algae				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	20				
Boulder	15				
Cobble	25				
Gravel	25				
Sand	5				
Silt	T				
Clay	T				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	T				
Muck-Mud	0				
Marl	0				
Other					

S.F. Sun River
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	12.2				
Dissolved oxygen (ppm)	9.1				
pH					
Conductivity					
Other					
Stream type	cold				
Water odors	normal				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	2				
Filamentous algae	1				
Aquatic moss	1				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	3				
Fish	1				
Other macrophytes	1				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	6				
Degree of embeddedness	4				
Dominant embedding material	4				

Comments

:1990 see field notes

Tenderfoot Creek

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSTENDER

Date	Sep 6 90				
Investigator					

Riparian Zone/Instream Features

Land class	field/pas				
Local watershed erosion	none				
Local NPS pollution	some				
Estimated stream width (m)	4.5				
Estimated stream depth (m)					
Riffle	0.1				
Run	0.4				
Pool	0.9				
High water mark (m)	0.3				
Velocity	:2 fps				
Dam present?	no				
Channelized?	no				
Canopy cover	part open				
Other					

Sediment/Substrate

Sediment odors	normal				
Sediment oils	absent				
Sediment deposits	snad				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	5				
Cobble	40				
Gravel	53				
Sand	2				
Silt	T				
Clay	T				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	5				
Muck-Mud	0				
Marl	0				
Other					

Tenderfoot Creek
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	11.6				
Dissolved oxygen (ppm)	9.7				
pH	8.21				
Conductivity					
Other					
Stream type	cold				
Water odors	normal				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	3				
Filamentous algae	2				
Aquatic moss	0				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	3				
Fish	2				
Other macrophytes	0				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	6				
Degree of embeddedness	4				
Dominant embedding material	4				

Comments

:1990 see field notes

N.F. Teton River

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSNFTET

Date	Sep 11 90				
Investigator					

Riparian Zone/Instream Features

Land class	forest?				
Local watershed erosion	some				
Local NPS pollution	some				
Estimated stream width (m)	6				
Estimated stream depth (m)					
Riffle	0.2				
Run	0.2				
Pool	0.3				
High water mark (m)	0.6				
Velocity	:2fps				
Dam present?	no				
Channelized?	yes				
Canopy cover	open				
Other					

Sediment/Substrate

Sediment odors	none				
Sediment oils	absent				
Sediment deposits	sand*				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	10				
Cobble	60				
Gravel	20				
Sand	7				
Silt	3				
Clay	0				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	T				
Muck-Mud	0				
Marl	0				
Other					

N.F. Teton River
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	10				
Dissolved oxygen (ppm)	9.6				
pH					
Conductivity					
Other					
Stream type	cold				
Water odors	none				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	5				
Filamentous algae	0				
Aquatic moss	1				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	3				
Fish	1				
Other macrophytes	0				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	6				
Degree of embeddedness	4				
Dominant embedding material	3				

Comments

:1990 some Ca deposits on rocks; stream channelized inpast 5 years; young willows common on banks; <1 % gradient; many overflow channels.

Tongue River near Pyramid Butte

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSTRPB

Date	Jul 19 90				
Investigator					

Riparian Zone/Instream Features

Land class	pasture				
Local watershed erosion	moderate				
Local NPS pollution	some				
Estimated stream width (m)	25				
Estimated stream depth (m)					
Riffle	0.5				
Run	1				
Pool	>1				
High water mark (m)	0.5				
Velocity	:2 fps				
Dam present?	yes				
Channelized?	no				
Canopy cover	part shade				
Other					

Sediment/Substrate

Sediment odors	normal				
Sediment oils	absent				
Sediment deposits	none				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	10				
Cobble	50				
Gravel	30				
Sand	5				
Silt	5				
Clay	0				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM					
Muck-Mud					
Marl					
Other					

Tongue River
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	24				
Dissolved oxygen (ppm)	11.6				
pH	8.94				
Conductivity					
Other					
Stream type	cold				
Water odors	musty*				
Water surface oils	none				
Turbidity	slight				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	2				
Filamentous algae	4				
Aquatic moss	2				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	3				
Fish	3				
Other macrophytes	2				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	7				
Degree of embeddedness	3				
Dominant embedding material	4				

Comments

:1990
ca. 800 cfs; flow has been variable; road construction upstream; cobbles covered with Cladophora & ?Fontinalis.

Tule Creek downstream of hwy 13

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSTULE13

Date	Aug 23 90				
Investigator					

Riparian Zone/Instream Features

Land class	field/pas				
Local watershed erosion	slight				
Local NPS pollution	some				
Estimated stream width (m)	:1-4				
Estimated stream depth (m)					
Riffle	<0.1				
Run	NA				
Pool	1				
High water mark (m)	1				
Velocity					
Dam present?					
Channelized?					
Canopy cover					
Other					

Sediment/Substrate

Sediment odors	anaerobic				
Sediment oils	absent				
Sediment deposits	*				
Black undersides of rocks?	yes*				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	<1				
Cobble	30				
Gravel	30				
Sand	10				
Silt	30				
Clay	T				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	:20-30				
Muck-Mud	*				
Marl					
Other					

Tule Creek

Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	18.2				
Dissolved oxygen (ppm)	8				
pH	7.82				
Conductivity					
Other					
Stream type	cold				
Water odors	normal				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	4				
Filamentous algae	3				
Aquatic moss	1				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	3				
Fish	2				
Other macrophytes	3				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	5				
Degree of embeddedness	1				
Dominant embedding material	1				

Comments

:1990 see extensive field notes

Waldron Creek

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSWALD

Date	Sep 11 90				
Investigator					

Riparian Zone/Instream Features

Land class	forest				
Local watershed erosion	moderate				
Local NPS pollution	some				
Estimated stream width (m)	1.2				
Estimated stream depth (m)					
Riffle	0.1				
Run	NA				
Pool	0.2				
High water mark (m)	0.3				
Velocity	:1.5 fps				
Dam present?	no				
Channelized?	no				
Canopy cover	part open				
Other					

Sediment/Substrate

Sediment odors	normal				
Sediment oils	absent				
Sediment deposits	silt				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	3				
Boulder	20				
Cobble	30				
Gravel	30				
Sand	4				
Silt	10				
Clay	T				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	3				
Muck-Mud	T				
Marl	0				
Other					

Waldron Creek
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	10				
Dissolved oxygen (ppm)	9.4				
pH					
Conductivity					
Other					
Stream type	cold				
Water odors	none				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	2				
Filamentous algae	0				
Aquatic moss	1				
Hydrozoa	0				
Slimes	1				
Porifera	0				
Macroinvertebrates	2				
Fish	0				
Other macrophytes	0				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	6				
Degree of embeddedness	3				
Dominant embedding material	2				

Comments

:1990 slumpimg along banks; old road on left bank; stream carries substantial spring flows; some scour and blown debris jams evident; banks unstable where seeps enter; numerous slumps may contribute silt & impair habitat.
see other 1990 field notes

Willow Creek at hwy 2

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSWILL2

Date	Aug 20 90				
Investigator					

Riparian Zone/Instream Features

Land class	field/pas				
Local watershed erosion	slight				
Local NPS pollution	some				
Estimated stream width (m)	1.5				
Estimated stream depth (m)					
Riffle	0.1				
Run	0.2				
Pool	0.3				
High water mark (m)	2				
Velocity	<0.1 mps				
Dam present?	yes				
Channelized?	no				
Canopy cover	open				
Other					

Sediment/Substrate

Sediment odors	anaerobic				
Sediment oils	absent				
Sediment deposits	*				
Black undersides of rocks?	yes				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	0				
Cobble	<5				
Gravel	5				
Sand	20				
Silt	60				
Clay	10				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	40				
Muck-Mud	>50				
Marl	0				
Other					

Willow Creek
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	24.2				
Dissolved oxygen (ppm)	6.9				
pH	8.5				
Conductivity					
Other					
Stream type	warm				
Water odors	normal				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	2				
Filamentous algae	4				
Aquatic moss	0				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	4				
Fish	2				
Other macrophytes	2				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	2				
Degree of embeddedness	1				
Dominant embedding material	2				

Comments

:1990 organic stain in pools; 40% cover by mats of fila. algae; bottom= sand, silt, muck for most of stream; some gravel & cobble in rare riffles. see field notes.

Wisconsin Creek

PHYSICAL CHARACTERIZATION SUMMARY-SINGLE SITE TREND ANALYSIS
Montana, Rapid Bioassessment Protocol 3
File: HSWISC

Date	Aug 4 90				
Investigator					

Riparian Zone/Instream Features

Land class	forest				
Local watershed erosion	none				
Local NPS pollution	none				
Estimated stream width (m)	0.6				
Estimated stream depth (m)					
Riffle	0.03				
Run	NA				
Pool	0.15				
High water mark (m)	0.15				
Velocity	<1fps				
Dam present?	no				
Channelized?	no				
Canopy cover	shaded				
Other					

Sediment/Substrate

Sediment odors	none				
Sediment oils	absent				
Sediment deposits	sand				
Black undersides of rocks?	no				
Other					

Inorganic Substrate Components

Percent composition in sampling area

Bedrock	0				
Boulder	10				
Cobble	30				
Gravel	15				
Sand	35				
Silt	5				
Clay	0				
Other					

Organic Substrate Components

Percent composition in sampling area

Detritus/CPOM	5				
Muck-Mud	T				
Marl	T				
Other					

Wisconsin Creek
Physical Characterization Summary cont.

Water Quality/Field Measurements

Temperature (C)	10				
Dissolved oxygen (ppm)	8.9				
pH					
Conductivity					
Other					
Stream type	cold				
Water odors	normal				
Water surface oils	none				
Turbidity	clear				
Other					

Relative Abundance of Aquatic Biota

:0=absent/not observed 1=rare 2=common 3=abundant 4=dominant

Periphyton	1				
Filamentous algae	0				
Aquatic moss	5				
Hydrozoa	0				
Slimes	0				
Porifera	0				
Macroinvertebrates	2				
Fish	0				
Other macrophytes	0				

Three Number Substrate Evaluation

Dominant Sub. Part. Size Class	6				
Degree of embeddedness	4				
Dominant embedding material	2				

Comments

:1990

Armstrong Spring Creek, Sample 1, July 11, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
RBP Level II File: 902ARM A,B,C.

TAXACODE	Taxon	RA	%
A150	Turbellaria	108	4.24
C010	Hirudinea	24	0.94
D050	Sphaeriidae	8	0.31
D500	Lymnaeidae	36	1.41
D600	Physidae	326	12.80
E550	*Gammarus*	52	2.04
E710	*Caecidotea*	148	5.81
F000	Acari	4	0.16
	TOTAL: MISC. TAXA	706	27.73
H060	*Baetis*	492	19.32
H750	*Ephemerella*	4	0.16
I600	*Paraleptophlebia*	4	0.16
	TOTAL: EPHEMEROPTERA	500	19.64
N130	*Amiocentrus aspilus*	12	0.47
N150	*Brachycentrus*	24	0.94
N450	*Glossosoma*	8	0.31
O070	*Hydroptila*	276	10.84
	TOTAL: TRICHOPTERA	320	12.57
S220	*Heterlimnius*	24	0.94
	TOTAL: COLEOPTERA	24	0.94
U400	*Brachycera*	4	0.16
W300	Simuliidae	16	0.63
	TOTAL: DIPTERA	20	0.79
Y000	Chironomidae	964	37.86
Y520	*Cricotopus Nostococladius*	12	0.47
	TOTAL: CHIRONOMIDAE	976	38.33
	GRAND TOTAL	2546	100.00

Ben Hart Spring Creek, RBP5, July 16, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
RBP Level II File: 902BEN A,B,C.

TAXACODE	Taxon	RA	%
B000	Oligochaeta	24	0.99
D050	Sphaeriidae	8	0.33
D500	Lymnaeidae	4	0.17
D600	Physidae	24	0.99
	TOTAL: MISC. TAXA	60	2.48
H060	*Baetis*	276	11.42
H284	*Diphetor hageni*	60	2.48
H630	*Attenella*	4	0.17
H700	*Drunella*	4	0.17
H750	*Ephemerella*	156	6.46
H850	*Serratella*	12	0.50
I250	*Heptagenia*	140	5.79
I980	*Tricorythodes*	152	6.29
	TOTAL: EPHEMEROPTERA	804	33.28
N130	*Amiocentrus aspilus*	24	0.99
N150	*Brachycentrus*	64	2.65
N320	*Agapetus*	724	29.97
N450	*Glossosoma*	240	9.93
N575	*Helicopsyche*	8	0.33
O070	*Hydroptila*	36	1.49
P746	*Rhyacophila Vemna*	8	0.33
	TOTAL: TRICHOPTERA	1104	45.70
Q600	*Petrophila*	4	0.17
	TOTAL: LEPIDOPTERA	4	0.17
S220	*Heterlimnius*	100	4.14
	TOTAL: COLEOPTERA	100	4.14
W600	Stratiomyiidae	4	0.17
	TOTAL: DIPTERA	4	0.17
Y000	Chironomidae	340	14.07
	TOTAL: CHIRONOMIDAE	340	14.07
	GRAND TOTAL	2416	100.00

Big Hole River at Fishtrap, July 23, 1990

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
RBP Level II File: 902BIFI A,B,C.

TAXACODE	Taxon	RA	%
B000	Oligochaeta	24	0.61
D690	Planorbidae	8	0.20
F000	Acari	56	1.42
	TOTAL: MISC. TAXA	88	2.24
H060	*Baetis*	112	2.85
H280	*Diphetor*	24	0.61
H630	*Attenella*	64	1.63
H750	*Ephemerella*	8	0.20
H850	*Serratella*	32	0.81
I205	*Epeorus albertae*	24	0.61
I360	*Nixe*	208	5.28
I605	*Paraleptophlebia bicornuta*	8	0.20
I990	*Tricorythodes minutus*	136	3.46
	TOTAL: EPHEMEROPTERA	616	15.65
K125	*Claassenia sabulosa*	8	0.20
K200	*Hesperoperla pacifica*	8	0.20
K670	*Skwala*	8	0.20
K825	*Pteronarcys*	8	0.20
	TOTAL: PLECOPTERA	32	0.81
N150	*Brachycentrus*	16	0.41
N650	Hydropsychidae	1240	31.50
O070	*Hydroptila*	72	1.83
O420	*Lepidostoma*	8	0.20
O530	*Ceraclea*	32	0.81
O630	*Oecetis*	8	0.20
P220	*Wormaldia*	8	0.20
	TOTAL: TRICHOPTERA	1384	35.16
S320	*Optioservus*	128	3.25
S440	*Zaitzevia*	64	1.63
	TOTAL: COLEOPTERA	192	4.88
U450	Ceratopogonidae	72	1.83
W300	Simuliidae	40	1.02
	TOTAL: DIPTERA	112	2.85
Y000	Chironomidae	1384	35.16
Y520	*Cricotopus Nostococladius*	128	3.25
	TOTAL: CHIRONOMIDAE	1512	38.41
	GRAND TOTAL	3936	100.00

Big Spring Creek Below State Hatchery, July 25, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
RBP Level II File: 902BSC A,B,C.

TAXACODE	Taxon	RA	%
A150	Turbellaria	32	0.59
B000	Oligochaeta	8	0.15
D050	Sphaeriidae	8	0.15
D500	Lymnaeidae	24	0.44
D600	Physidae	32	0.59
	TOTAL: MISC. TAXA	104	1.91
H024	*Acentrella*	32	0.59
H060	*Baetis*	96	1.76
H280	*Diphetor*	8	0.15
H750	*Ephemerella*	376	6.89
	TOTAL: EPHEMEROPTERA	512	9.38
J780	*Malenka*	24	0.44
	TOTAL: PLECOPTERA	24	0.44
L660	*Brachycentrus*	1528	28.01
	TOTAL: HEMIPTERA	1528	28.01
N210	*Micrasema*	288	5.28
N450	*Glossosoma*	72	1.32
O420	*Lepidostoma*	2760	50.59
P630	*Rhyacophila Brunnea Gr.*	24	0.44
P870	*Neophylax*	8	0.15
	TOTAL: TRICHOPTERA	3152	57.77
S320	Optioservus	16	0.29
	TOTAL: COLEOPTERA	16	0.29
W300	Simuliidae	24	0.44
X560	*Antocha*	24	0.44
X870	*Tipula*	8	0.15
	TOTAL: DIPTERA	56	1.03
Y000	Chironomidae	64	1.17
	TOTAL: CHIRONOMIDAE	64	1.17
	GRAND TOTAL	5456	100.00

Odell Creek, RBP1, July 8, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
RBP Level II File: 902ODE1 A,B,C.

TAXACODE	Taxon	RA	%
B000	Oligochaeta	60	3.60
D580	*Stagnicola*	148	8.87
D700	*Gyraulus*	8	0.48
	TOTAL: MISC. TAXA	216	12.95
H060	*Baetis*	30	1.80
H284	*Diphetor hageni*	2	0.12
H640	*Attenella margarita*	34	2.04
I990	*Tricorythodes minutus*	42	2.52
	TOTAL: EPHEMEROPTERA	108	6.47
K125	*Claassenia sabulosa*	4	0.24
K200	*Hesperoperla pacifica*	16	0.96
K450	*Isoperla*	2	0.12
K670	*Skwala*	4	0.24
	TOTAL: PLECOPTERA	26	1.56
N130	*Amiocentrus aspilus*	2	0.12
N575	*Helicopsyche borealis*	134	8.03
N800	*Hydropsyche*	18	1.08
O120	*Pteronarcys californica*	4	0.24
P000	*Brachycentrus americanus*	4	0.24
P070	*Brachycentrus occidentalis*	118	7.07
P630	*Rhyacophila Brunnea Gr.*	6	0.36
	TOTAL: TRICHOPTERA	286	17.15
Q500	*Glossosoma*	136	8.15
	TOTAL: LEPIDOPTERA	136	8.15
S320	*Optioservus*	742	44.48
S440	*Zaitzevia*	4	0.24
	TOTAL: COLEOPTERA	746	44.72
W300	Simuliidae	10	0.60
X560	*Antocha*	4	0.24
X680	*Prosimulium*	4	0.24
	TOTAL: DIPTERA	18	1.08
Y000	Chironomidae	132	7.91
	TOTAL: CHIRONOMIDAE	132	7.91
	GRAND TOTAL	1668	100.00

Four Mile Creek, Sept 13, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
RBP Level II File: 902 FOUR A,B,C.

TAXACODE	Taxon	RA	%
A150	Turbellaria	14	2.43
A300	Nematoda	7	1.22
E100	Cladocera	1	0.17
F000	Acari	1	0.17
	TOTAL: MISC. TAXA	23	4.00
H060	*Baetis*	27	4.70
H710	*Drunella doddsi*	25	4.35
H715	*Drunella grandis*	11	1.91
H750	*Ephemerella*	8	1.39
I150	*Cinygmula*	46	8.00
I205	*Epeorus albertae*	2	0.35
I215	*Epeorus longimanus*	1	0.17
I220	*Epeorus grandis*	8	1.39
I420	*Rhithrogena*	181	31.48
I900	*Ameletus*	8	1.39
	TOTAL: EPHEMEROPTERA	317	55.13
J020	Capniidae	1	0.17
J470	*Sweltsa*	3	0.52
J956	*Zapada cinctipes*	1	0.17
J959	*Zapada columbiana*	22	3.83
J977	*Zapada Oregonensis Gr.*	28	4.87
K130	*Doroneuria*	14	2.43
K300	Perlodidae	9	1.57
K900	Taeniopterygidae	2	0.35
	TOTAL: PLECOPTERA	80	13.91
N080	*Parapsyche*	18	3.13
N210	*Micrasema*	20	3.48
N375	*Anagapetus*	1	0.17
O730	*Apatania*	30	5.22
O805	*Ecclisomyia*	8	1.39
P622	*Rhyacophila Betteni Gr.*	11	1.91
P630	*Rhyacophila Brunnea Gr.*	1	0.17
P656	*Rhyacophila Hyalinata Gr.*	10	1.74
P686	*Rhyacophila narvae*	2	0.35
P724	*Rhyacophila Sibirica Gr.*	2	0.35
P870	*Neophylax*	14	2.43
P910	*Neothremma*	3	0.52
	TOTAL: TRICHOPTERA	120	20.87
S220	*Heterlimnius*	4	0.70
	TOTAL: COLEOPTERA	4	0.70
V500	Empididae	2	0.35
W300	Simuliidae	2	0.35
X610	*Dicranota*	2	0.35
X870	*Tipula*	1	0.17
	TOTAL: DIPTERA	7	1.22
Y000	Chironomidae	13	2.26
Y520	*Cricotopus Nostococladius*	11	1.91
	TOTAL: CHIRONOMIDAE	24	4.17
	GRAND TOTAL	575	100.00

Lake Fork Rock Creek, August 22, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
RBP Level II File: 902LFRC A,B,C.

TAXACODE	Taxon	RA	%
B000	Oligochaeta	4	0.69
	TOTAL: MISC. TAXA	4	0.69
H060	*Baetis*	112	19.31
H705	*Drunella coloradensis*	4	0.69
H710	*Drunella doddsi*	20	3.45
H870	*Serratella tibialis*	8	1.38
I150	*Cinygmula*	168	28.97
I205	*Epeorus albertae*	8	1.38
I420	*Rhithrogena*	8	1.38
I900	*Ameletus*	20	3.45
	TOTAL: EPHEMEROPTERA	348	60.00
J470	*Sweltsa*	4	0.69
J956	*Zapada cinctipes*	4	0.69
J959	*Zapada columbiana*	16	2.76
J977	*Zapada Oregonensis Gr.*	28	4.83
K130	*Doroneuria*	12	2.07
K200	*Hesperoperla pacifica*	20	3.45
	TOTAL: PLECOPTERA	84	14.48
N089	*Parapsyche elsis*	4	0.69
P622	*Rhyacophila Betteni Gr.*	4	0.69
P630	*Rhyacophila Brunnea Gr.*	12	2.07
P656	*Rhyacophila Hyalinata Gr.*	4	0.69
	TOTAL: TRICHOPTERA	24	4.14
V500	Empididae	12	2.07
W300	Simuliidae	4	0.69
	TOTAL: DIPTERA	16	2.76
Y000	Chironomidae	104	17.93
	TOTAL: CHIRONOMIDAE	104	17.93
	GRAND TOTAL	580	100.00

Pine Creek, July 26, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
RBP Level II File: 902PINE A,B,C.

TAXACODE	Taxon	RA	%
A150	Turbellaria	26	8.02
A300	Nematoda	1	0.31
	TOTAL: MISC. TAXA	27	8.33
H705	*Drunella coloradensis*	2	0.62
H850	*Serratella*	18	5.56
I050	*Cinygma*	10	3.09
I200	*Epeorus*	3	0.93
I220	*Epeorus grandis*	5	1.54
I900	*Ameletus*	2	0.62
	TOTAL: EPHEMEROPTERA	40	12.35
J470	*Sweltsa*	2	0.62
J959	*Zapada columbiana*	8	2.47
J977	*Zapada Oregonensis Gr.*	5	1.54
K300	Perlodidae	5	1.54
K785	*Yoraperla*	89	27.47
	TOTAL: PLECOPTERA	109	33.64
N080	*Parapsyche*	1	0.31
N210	*Micrasema*	17	5.25
O420	*Lepidostoma*	1	0.31
P630	*Rhyacophila Brunnea Gr.*	4	1.23
P746	*Rhyacophila Vemna*	1	0.31
P910	*Neothremma*	61	18.83
	TOTAL: TRICHOPTERA	85	26.23
S220	*Heterlimnius*	4	1.23
	TOTAL: COLEOPTERA	4	1.23
V500	Empididae	3	0.93
V950	Pelecorhynchidae	1	0.31
W300	Simuliidae	2	0.62
	TOTAL: DIPTERA	6	1.85
Y000	Chironomidae	53	16.36
	TOTAL: CHIRONOMIDAE	53	16.36
	GRAND TOTAL	324	100.00

Stone Creek, August 30, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
RBP Level II   File: 902STON A,B,C.

TAXACOD	Taxon	RA	%
A150	Turbellaria	8	1.88
B000	Oligochaeta	1	0.24
E300	Ostracoda	1	0.24
	TOTAL: MISC. TAXA	10	2.35
H060	*Baetis*	13	3.06
H705	*Drunella coloradensis*	8	1.88
H710	*Drunella doddsi*	18	4.24
H725	*Drunella spinifera*	7	1.65
I150	*Cinygmula*	31	7.29
I205	*Epeorus albertae*	53	12.47
I215	*Epeorus longimanus*	1	0.24
I220	*Epeorus grandis*	52	12.24
I420	*Rhithrogena*	42	9.88
I900	*Ameletus*	4	0.94
	TOTAL: EPHEMEROPTERA	229	53.88
J020	Capniidae	1	0.24
J470	*Sweltsa*	8	1.88
J550	Leuctridae	1	0.24
J945	*Visoka cataractae*	2	0.47
J959	*Zapada columbiana*	32	7.53
J977	*Zapada Oregonensis Gr.*	8	1.88
K130	*Doroneuria*	1	0.24
K300	Perlodidae	10	2.35
K785	*Yoraperla*	46	10.82
K900	Taeniopterygidae	1	0.24
	TOTAL: PLECOPTERA	110	25.88
N080	*Parapsyche*	14	3.29
N450	*Glossosoma*	7	1.65
O700	Limnephilidae	4	0.94
O760	*Chyranda centralis*	1	0.24
O797	*Dicosmoecus*	1	0.24
O805	*Ecclisomyia*	19	4.47
P622	*Rhyacophila Betteni Gr.*	2	0.47
P630	*Rhyacophila Brunnea Gr.*	8	1.88
P656	*Rhyacophila Hyalinata Gr.*	3	0.71
P662	*Rhyacophila Iranda Gr.*	5	1.18
P686	*Rhyacophila narvae*	4	0.94
	TOTAL: TRICHOPTERA	68	16.00
S220	*Heterlimnius*	6	1.41
	TOTAL: COLEOPTERA	6	1.41
V500	Empididae	1	0.24
W300	Simuliidae	1	0.24
	TOTAL: DIPTERA	2	0.47
	GRAND TOTAL	425	100.00

S.F. Sun River, Sept 12, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
RBP Level II File: 902 SUN A,B,C.

TAXACODE	Taxon	RA	%
A300	Nematoda	2	0.22
	TOTAL: MISC. TAXA	2	0.22
H060	*Baetis*	34	3.71
H650	*Caudatella*	8	0.87
H710	*Drunella doddsi*	212	23.14
H715	*Drunella grandis*	30	3.28
H750	*Ephemerella*	20	2.18
I205	*Epeorus albertae*	22	2.40
I215	*Epeorus longimanus*	44	4.80
I420	*Rhithrogena*	166	18.12
I600	*Paraleptophlebia*	2	0.22
	TOTAL: EPHEMEROPTERA	538	58.73
J470	*Sweltsa*	2	0.22
J959	*Zapada columbiana*	6	0.66
J977	*Zapada Oregonensis Gr.*	44	4.80
K300	Perlodidae	32	3.49
K450	*Isoperla*	10	1.09
K550	*Brachycentrus*	30	3.28
K620	*Micrasema*	6	0.66
	TOTAL: PLECOPTERA	130	14.19
N050	*Arctopsyche*	14	1.53
N089	*Parapsyche*	2	0.22
N450	*Glossosoma*	2	0.22
P600	*Rhyacophila*	22	2.40
P622	*Rhyacophila Betteni Gr.*	10	1.09
P630	*Rhyacophila Brunnea Gr.*	32	3.49
P656	*Rhyacophila Hyalinata Gr.*	8	0.87
P662	*Rhyacophila Iranda Gr.*	2	0.22
P940	*Oligophlebodes*	2	0.22
	TOTAL: TRICHOPTERA	94	10.26
Q550	Blephariceridae	4	0.44
	TOTAL: LEPIDOPTERA	4	0.44
S220	*Heterlimnius*	8	0.87
	TOTAL: COLEOPTERA	8	0.87
V500	Empididae	4	0.44
W300	Simuliidae	2	0.22
X670	*Hexatoma*	10	1.09
	TOTAL: DIPTERA	16	1.75
Y000	Chironomidae	102	11.14
Y520	*Cricotopus Nostococladius*	22	2.40
	TOTAL: CHIRONOMIDAE	124	13.54
	GRAND TOTAL	916	100.00

Wisconson Creek, August 4, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
RBP Level II File: 902WIS A,B,C.

	Taxon	RA	%
A150	Turbellaria	28	3.29
A300	Nematoda	2	0.24
B000	Oligochaeta	4	0.47
E300	Ostracoda	6	0.71
F000	Acari	6	0.71
	TOTAL: MISC. TAXA	46	5.41
H850	*Serratella*	6	0.71
I050	*Cinygma*	22	2.59
I150	*Cinygmula*	12	1.41
I600	*Paraleptophlebia*	4	0.47
I900	*Ameletus*	76	8.94
	TOTAL: EPHEMEROPTERA	120	14.12
J470	*Sweltsa*	8	0.94
J945	*Visoka cataractae*	6	0.71
J959	*Zapada columbiana*	138	16.24
J977	*Zapada Oregonensis Gr.*	8	0.94
K450	*Isoperla*	8	0.94
K610	*Perlinodes*	6	0.71
	TOTAL: PLECOPTERA	174	20.47
N080	*Parapsyche*	4	0.47
N320	*Agapetus*	2	0.24
O780	*Cryptochia*	2	0.24
P662	*Rhyacophila Iranda Gr.*	24	2.82
P746	*Rhyacophila Vemna*	10	1.18
P915	*Neothremma alicia*	362	42.59
	TOTAL: TRICHOPTERA	404	47.53
S220	*Heterlimnius*	2	0.24
S440	*Zaitzevia*	2	0.24
	TOTAL: COLEOPTERA	4	0.47
V500	Empididae	6	0.71
W300	Simuliidae	4	0.47
X670	*Hexatoma*	2	0.24
X790	*Pedicia*	2	0.24
X870	*Tipula*	12	1.41
	TOTAL: DIPTERA	26	3.06
Y000	Chironomidae	60	7.06
Y520	*Cricotopus Nostococladius*	16	1.88
	TOTAL: CHIRONOMIDAE	76	8.94
	GRAND TOTAL	850	100.00

Box Elder Creek, Riffle, July 18, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
RBP Level II File: 902BOXR A,B,C

TAXACODE	Taxon	RA	%
A110	Hydra	2	0.64
D410	Ancylidae	2	0.64
D600	Physidae	3	0.96
	TOTAL: MISC. TAXA	7	2.23
G600	Coenagrionidae	12	3.82
	TOTAL: ODONATA	12	3.82
H180	*Callibaetis*	9	2.87
H490	*Caenis*	24	7.64
I470	*Stenonema*	79	25.16
I550	*Leptophlebia*	6	1.91
I790	*Isonychia*	2	0.64
I990	*Tricorythodes minutus*	2	0.64
	TOTAL: EPHEMEROPTERA	122	38.85
L100	Corixidae	22	7.01
	TOTAL: HEMIPTERA	22	7.01
M550	*Sialis*	3	0.96
	TOTAL: MEGALOPTERA	3	0.96
O000	Hydroptilidae	39	12.42
O630	*Oecetis*	1	0.32
P450	*Polycentropus*	10	3.18
	TOTAL: TRICHOPTERA	50	15.92
Q600	*Petrophila*	1	0.32
	TOTAL: LEPIDOPTERA	1	0.32
S170	*Dubiraphia*	1	0.32
	TOTAL: COLEOPTERA	1	0.32
Y000	Chironomidae	96	30.57
	TOTAL: CHIRONOMIDAE	96	30.57
	GRAND TOTAL	314	100.00

Larb Creek, near mouth, near Saco, July 17, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
RBP Level II File: 902LAR A,B,C.

TAXACODE	Taxon	RA	%
A110	Hydra	20	1.52
B000	Oligochaeta	72	5.47
D600	Physidae	196	14.89
D690	Planorbidae	376	28.57
E100	Cladocera	28	2.13
E300	Ostracoda	4	0.30
E660	*Hyallela azteca*	48	3.65
F000	Acari	28	2.13
	TOTAL: MISC. TAXA	772	58.66
G300	Libellulidae	8	0.61
G600	Coenagrionidae	96	7.29
	TOTAL: ODONATA	104	7.90
H180	*Callibaetis*	72	5.47
H490	*Caenis*	56	4.26
	TOTAL: EPHEMEROPTERA	128	9.73
L050	Belostomatidae	4	0.30
L100	Corixidae	208	15.81
L650	Notonectidae	8	0.61
	TOTAL: HEMIPTERA	220	16.72
N650	Hydropsychidae	4	0.30
P250	Phryganeidae	8	0.61
P450	*Polycentropus*	8	0.61
	TOTAL: TRICHOPTERA	20	1.52
S170	*Dubiraphia*	8	0.61
S600	Haliplidae	4	0.30
T000	Hydrophilidae	4	0.30
	TOTAL: COLEOPTERA	16	1.22
U450	Ceratopogonidae	8	0.61
	TOTAL: DIPTERA	8	0.61
Y000	Chironomidae	48	3.65
	TOTAL: CHIRONOMIDAE	48	3.65
	GRAND TOTAL	1316	100.00

Tule Creek at Hwy.13, RBP 05-1, August 23, 1990.

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
RBP Level II File: 902TUL1 A,B,C.

TAXACODE	Taxon	RA	%
A110	Hydra	4	0.26
B000	Oligochaeta	96	6.33
D600	Physidae	220	14.51
D690	Planorbidae	4	0.26
E100	Cladocera	40	2.64
E300	Ostracoda	4	0.26
E500	Gammaridae	176	11.61
E660	*Hyallela azteca*	240	15.83
	TOTAL: MISC. TAXA	784	51.72
G600	Coenagrionidae	184	12.14
	TOTAL: ODONATA	184	12.14
H180	*Callibaetis*	80	5.28
H490	*Caenis*	20	1.32
I500	Leptophlebiidae	4	0.26
I980	*Tricorythodes*	4	0.26
	TOTAL: EPHEMEROPTERA	108	7.12
L100	Corixidae	40	2.64
L360	*Gerris*	28	1.85
	TOTAL: HEMIPTERA	68	4.49
R200	Dytiscidae	8	0.53
S600	Haliplidae	92	6.07
	TOTAL: COLEOPTERA	100	6.60
V000	Culicidae	4	0.26
	TOTAL: DIPTERA	4	0.26
Y000	Chironomidae	268	17.68
	TOTAL: CHIRONOMIDAE	268	17.68
	GRAND TOTAL	1516	100.00

Willow Creek at Hwy.2, RBP#1, August 20, 1990

Montana, Rapid Bioassessment Protocol, Benthic Macroinvertebrate Sample.
Relative abundance and percent contribution of taxa.
RBP Level II File: 902WIL1 A,B,C.

TAXACODE	Taxon	RA	%
D500	Lymnaeidae	16	0.13
D600	Physidae	232	1.87
D690	Planorbidae	384	3.10
E100	Cladocera	1664	13.44
E200	Copepoda	96	0.78
E300	Ostracoda	32	0.26
E660	*Hyallela azteca*	5192	41.94
	TOTAL: MISC. TAXA	7616	61.52
G300	Libellulidae	8	0.06
G600	Coenagrionidae	112	0.90
	TOTAL: ODONATA	120	0.97
H180	*Callibaetis*	80	0.65
H490	*Caenis*	2192	17.71
	TOTAL: EPHEMEROPTERA	2272	18.35
L100	Corixidae	128	1.03
	TOTAL: HEMIPTERA	128	1.03
N650	Hydropsychidae	56	0.45
O070	*Hydroptila*	160	1.29
O630	*Oecetis*	8	0.06
	TOTAL: TRICHOPTERA	224	1.81
R200	Dytiscidae	32	0.26
S600	Haliplidae	8	0.06
	TOTAL: COLEOPTERA	40	0.32
U450	Ceratopogonidae	72	0.58
V860	*Limnophora*	8	0.06
W300	Simuliidae	72	0.58
X550	Tipulidae	8	0.06
	TOTAL: DIPTERA	160	1.29
Y000	Chironomidae	1819	14.69
	TOTAL: CHIRONOMIDAE	1819	14.69
	GRAND TOTAL	12379	100.00

Armstrong Spring Creek, Sample 1, July 11, 1990.
Montana, RBP Benthic Macroinvertebrate Sample.

```
RBP Level II   File: 902ARM  A,B,C.


TOTAL ABUNDANCE =   2546
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance =    820

TOTAL NUMBER OF TAXA =   20
Number EPT taxa =    7

TAXONOMIC GROUP COMPOSITION
GROUP            #TAXA ABUNDANCE PERCENT
Misc. Taxa          8       706    27.71
Odonata             0         0      .00
Ephemeroptera       3       500    19.64
Plecoptera          0         0      .00
Hemiptera           0         0      .00
Megaloptera         0         0      .00
Trichoptera         4       320    12.56
Lepidoptera         0         0      .00
Coleoptera          1        24      .94
Misc. Diptera       2        20      .79
Chironomidae        2       976    38.33

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae                  =    .84
Hydropsychidae/Total Trichoptera =    .00

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION
GROUP                #TAXA  ABUNDANCE PERCENT
Predator                1         24      .94
Parasite                1          4      .16
Collector-gatherer     11       1214    47.66
Collector-filterer      1         16      .63
Macrophyte-herbivore    0          0      .00
Piercer-herbivore       2        288    11.31
Scraper                 1          8      .31
Shredder                0          0      .00
Xylophage               0          0      .00
Omnivore                1         24      .94
Unknown                 2        968    38.02

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer         =     .50
Scraper/(Scraper + C.-filterer)    =     .33
Shredder/Total organisms           =    .000
```

```
Armstrong Spring Creek, Sample 1, July 11, 1990 cont.


CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                      ABUNDANCE PERCENT
Chironomidae                    964    37.86
Baetis                          492    19.32
Physidae                        326    12.80
Hydroptila                      276    10.84
Caecidotea                      148     5.81
SUBTOTAL 5 DOMINANTS           2206    86.63
Turbellaria                     108     4.24
Gammarus                         52     2.04
Lymnaeidae                       36     1.41
Hirudinea                        24      .94
Brachycentrus                    24      .94
TOTAL 10 DOMINANTS             2450    96.20

SAPROBIC INDICES
Hilsenhoff Biotic Index              =   6.02
Biotic Condition Index
   Community Tolerance Quotient (a) =  85.05
   Community Tolerance Quotient (d) = 133.00

DIVERSITY MEASURES
Shannon H (loge) =  1.92
Shannon H (log2) =  2.77
Evenness         =   .64
Brillouin H      =  1.90
Simpson D        =   .21

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine      1420    55.77
Univoltine        1074    42.18
Semivoltine         52     2.04

INDICATOR ASSEMBLAGES
ASSEMBLAGE              ABUNDANCE     PERCENT
  A                             0         .00
  B                             0         .00
  C                             0         .00
  D                             0         .00
  E                             0         .00
  F                             0         .00
  G                             0         .00
  H                             0         .00
  I                             0         .00
  J                             0         .00

 End of report.
```

Ben Hart Spring Creek, RBP5, July 16, 1990. Montana, RBP Benthic Macroinvertebrate Sample.

```
RBP Level II   File: 902BEN  A,B,C.


TOTAL ABUNDANCE =   2416
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance =   1908

TOTAL NUMBER OF TAXA =   23
Number EPT taxa =   15

TAXONOMIC GROUP COMPOSITION
GROUP               #TAXA ABUNDANCE PERCENT
Misc. Taxa             4        60     2.48
Odonata                0         0      .00
Ephemeroptera          8       804    33.28
Plecoptera             0         0      .00
Hemiptera              0         0      .00
Megaloptera            0         0      .00
Trichoptera            7      1104    45.69
Lepidoptera            1         4      .17
Coleoptera             1       100     4.14
Misc. Diptera          1         4      .17
Chironomidae           1       340    14.07

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae                    =   5.61
Hydropsychidae/Total Trichoptera =      .00

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION
GROUP                   #TAXA  ABUNDANCE PERCENT
Predator                    1          8       .33
Parasite                    0          0       .00
Collector-gatherer         14        852     35.27
Collector-filterer          0          0       .00
Macrophyte-herbivore        0          0       .00
Piercer-herbivore           1         36      1.49
Scraper                     5       1116     46.19
Shredder                    0          0       .00
Xylophage                   0          0       .00
Omnivore                    1         64      2.65
Unknown                     1        340     14.07

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filter undefined - Coll.-Filt.=0
Scraper/(Scraper + C.-filterer)    =    1.00
Shredder/Total organisms           =    .000
```

```
Ben Hart Spring Creek, RBP5, July 16, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Agapetus                        724   29.97
Chironomidae                    340   14.07
Baetis                          276   11.42
Glossosoma                      240    9.93
Ephemerella                     156    6.46
SUBTOTAL 5 DOMINANTS           1736   71.85
Tricorythodes                   152    6.29
Heptagenia                      140    5.79
Heterlimnius                    100    4.14
Brachycentrus                    64    2.65
Diphetor hageni                  60    2.48
TOTAL 10 DOMINANTS             2252   93.20

SAPROBIC INDICES
Hilsenhoff Biotic Index                    =   2.71
Biotic Condition Index
   Community Tolerance Quotient (a) =  67.65
   Community Tolerance Quotient (d) = 100.00

DIVERSITY MEASURES
Shannon H (loge) =  2.29
Shannon H (log2) =  3.30
Evenness         =   .73
Brillouin H      =  2.26
Simpson D        =   .15

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine      534    22.10
Univoltine       1698    70.28
Semivoltine       184     7.62

INDICATOR ASSEMBLAGES
ASSEMBLAGE                 ABUNDANCE      PERCENT
  A                                0          .00
  B                                0          .00
  C                                0          .00
  D                                0          .00
  E                                0          .00
  F                                0          .00
  G                                0          .00
  H                                0          .00
  I                                0          .00
  J                                0          .00

 End of report.
```

Big Hole River at Fishtrap, July 23, 1990
Montana, RBP Benthic Macroinvertebrate Sample.

RBP Level II File: 902BIFI A,B,C.

TOTAL ABUNDANCE = 3936
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 2032

TOTAL NUMBER OF TAXA = 29
Number EPT taxa = 20

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	3	88	2.23
Odonata	0	0	.00
Ephemeroptera	9	616	15.65
Plecoptera	4	32	.80
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	7	1384	35.15
Lepidoptera	0	0	.00
Coleoptera	2	192	4.88
Misc. Diptera	2	112	2.85
Chironomidae	2	1512	38.41

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 1.34
Hydropsychidae/Total Trichoptera = .90

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	4	96	2.43
Parasite	1	56	1.42
Collector-gatherer	9	472	12.00
Collector-filterer	3	1288	32.72
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	2	200	5.08
Scraper	4	368	9.34
Shredder	1	8	.20
Xylophage	0	0	.00
Omnivore	4	64	1.62
Unknown	1	1384	35.16

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = .29
Scraper/(Scraper + C.-filterer) = .22
Shredder/Total organisms = .002

Big Hole River at Fishtrap, July 23, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA

TAXON	ABUNDANCE	PERCENT
Chironomidae	1384	35.16
Hydropsychidae	1240	31.50
Nixe	208	5.28
Tricorythodes minutus	136	3.46
Optioservus	128	3.25
SUBTOTAL 5 DOMINANTS	3096	78.65
Cricotopus Nostococladius	128	3.25
Baetis	112	2.85
Hydroptila	72	1.83
Ceratopogonidae	72	1.83
Attenella	64	1.63
TOTAL 10 DOMINANTS	3544	90.04

SAPROBIC INDICES
Hilsenhoff Biotic Index = 4.60
Biotic Condition Index
Community Tolerance Quotient (a) = 65.83
Community Tolerance Quotient (d) = 121.00

DIVERSITY MEASURES
Shannon H (loge) = 2.03
Shannon H (log2) = 2.93
Evenness = .60
Brillouin H = 2.02
Simpson D = .23

COMMUNITY VOLTINISM ANALYSIS

TYPE	ABUNDANCE	PERCENT
Multivoltine	1656	42.07
Univoltine	2036	51.73
Semivoltine	244	6.20

INDICATOR ASSEMBLAGES

ASSEMBLAGE	ABUNDANCE	PERCENT
A	0	.00
B	0	.00
C	0	.00
D	0	.00
E	0	.00
F	0	.00
G	0	.00
H	0	.00
I	0	.00
J	0	.00

End of report.

Big Spring Creek Below State Hatchery, July 25, 1990. Montana, RBP Benthic Macroinvertebrate Sample.

RBP Level II File: 902BSC A,B,C.

TOTAL ABUNDANCE = 5456
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 3688

TOTAL NUMBER OF TAXA = 21
Number EPT taxa = 10

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	5	104	1.92
Odonata	0	0	.00
Ephemeroptera	4	512	9.39
Plecoptera	1	24	.44
Hemiptera	1	1528	28.01
Megaloptera	0	0	.00
Trichoptera	5	3152	57.78
Lepidoptera	0	0	.00
Coleoptera	1	16	.29
Misc. Diptera	3	56	1.03
Chironomidae	1	64	1.17

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 57.63
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	2	1552	28.45
Parasite	0	0	.00
Collector-gatherer	10	640	11.75
Collector-filterer	1	24	.44
Macrophyte-herbivore	1	288	5.28
Piercer-herbivore	0	0	.00
Scraper	3	96	1.76
Shredder	2	2784	51.03
Xylophage	0	0	.00
Omnivore	1	8	.15
Unknown	1	64	1.17

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 4.00
Scraper/(Scraper + C.-filterer) = .80
Shredder/Total organisms = .510

```
Big Spring Creek Below State Hatchery, July 25, 1990 cont.


CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Lepidostoma                  2760     50.59
Brachycentrus                1528     28.01
Ephemerella                   376      6.89
Micrasema                     288      5.28
Baetis                         96      1.76
SUBTOTAL 5 DOMINANTS         5048     92.53
Glossosoma                     72      1.32
Chironomidae                   64      1.17
Turbellaria                    32       .59
Physidae                       32       .59
Acentrella                     32       .59
TOTAL 10 DOMINANTS           5280     96.79

SAPROBIC INDICES
Hilsenhoff Biotic Index                =   1.42
Biotic Condition Index
   Community Tolerance Quotient (a) =  68.38
   Community Tolerance Quotient (d) = 101.00

DIVERSITY MEASURES
Shannon H (loge) =  1.50
Shannon H (log2) =  2.16
Evenness         =   .49
Brillouin H      =  1.49
Simpson D        =   .34

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine      182     3.34
Univoltine       5238    96.00
Semivoltine        36      .66

INDICATOR ASSEMBLAGES
ASSEMBLAGE                ABUNDANCE     PERCENT
  A                              0         .00
  B                              0         .00
  C                              0         .00
  D                              0         .00
  E                              0         .00
  F                              0         .00
  G                              0         .00
  H                              0         .00
  I                              0         .00
  J                              0         .00

 End of report.
```

Odell Creek, RBP1, July 8, 1990.
Montana, RBP Benthic Macroinvertebrate Sample.

RBP Level II   File: 902ODE1 A,B,C.

TOTAL ABUNDANCE = 1668
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 420

TOTAL NUMBER OF TAXA = 25
Number EPT taxa = 15

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	3	216	12.95
Odonata	0	0	.00
Ephemeroptera	4	108	6.48
Plecoptera	4	26	1.56
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	7	286	17.14
Lepidoptera	1	136	8.15
Coleoptera	2	746	44.72
Misc. Diptera	3	18	1.08
Chironomidae	1	132	7.91

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 3.18
Hydropsychidae/Total Trichoptera = .06

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	5	32	1.92
Parasite	0	0	.00
Collector-gatherer	10	330	19.79
Collector-filterer	2	28	1.68
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	0	0	.00
Scraper	4	888	53.23
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	1	118	7.07
Unknown	3	272	16.30

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 31.71
Scraper/(Scraper + C.-filterer) = .97
Shredder/Total organisms = .000

```
Odell Creek, RBP1, July 8, 1990 cont.


CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                        ABUNDANCE PERCENT
Optioservus                      742     44.48
Stagnicola                       148      8.87
Glossosoma                       136      8.15
Helicopsyche borealis            134      8.03
Chironomidae                     132      7.91
SUBTOTAL 5 DOMINANTS            1292     77.44
Brachycentrus occidentalis       118      7.07
Oligochaeta                       60      3.60
Tricorythodes minutus             42      2.52
Attenella margarita               34      2.04
Baetis                            30      1.80
TOTAL 10 DOMINANTS              1576     94.47

SAPROBIC INDICES
Hilsenhoff Biotic Index                =   4.06
Biotic Condition Index
   Community Tolerance Quotient (a) =  67.74
   Community Tolerance Quotient (d) = 123.00

DIVERSITY MEASURES
Shannon H (loge) =  2.03
Shannon H (log2) =  2.93
Evenness         =   .63
Brillouin H      =  2.00
Simpson D        =   .23

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine      130      7.82
Univoltine        620     37.20
Semivoltine       917     54.98

INDICATOR ASSEMBLAGES
ASSEMBLAGE                  ABUNDANCE     PERCENT
  A                                0          .00
  B                                0          .00
  C                                0          .00
  D                                0          .00
  E                                0          .00
  F                                0          .00
  G                                0          .00
  H                                0          .00
  I                                0          .00
  J                                0          .00

 End of report.
```

Four Mile Creek, Sept 13, 1990.
Montana, RBP Benthic Macroinvertebrate Sample.

```
RBP Level II   File: 902 FOUR   A,B,C.


TOTAL ABUNDANCE =    575
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance =    517

TOTAL NUMBER OF TAXA =   41
Number EPT taxa =   30

TAXONOMIC GROUP COMPOSITION
GROUP            #TAXA ABUNDANCE PERCENT
Misc. Taxa          4       23     3.99
Odonata             0        0      .00
Ephemeroptera      10      317    55.13
Plecoptera          8       80    13.91
Hemiptera           0        0      .00
Megaloptera         0        0      .00
Trichoptera        12      120    20.86
Lepidoptera         0        0      .00
Coleoptera          1        4      .70
Misc. Diptera       4        7     1.22
Chironomidae        2       24     4.17

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae                 =  21.54
Hydropsychidae/Total Trichoptera =    .00

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION
GROUP                #TAXA  ABUNDANCE PERCENT
Predator               11          74     12.87
Parasite                1           1       .17
Collector-gatherer      7          97     16.87
Collector-filterer      2           3       .52
Macrophyte-herbivore    1          20      3.48
Piercer-herbivore       1          11      1.91
Scraper                 9         286     49.73
Shredder                4          52      9.04
Xylophage               0           0       .00
Omnivore                4          18      3.13
Unknown                 1          13      2.26

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer         =  95.33
Scraper/(Scraper + C.-filterer)    =    .99
Shredder/Total organisms           =   .090
```

```
Four Mile Creek,  Sept 13, 1990 cont.


CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                         ABUNDANCE PERCENT
Rhithrogena                        181    31.48
Cinygmula                           46     8.00
Apatania                            30     5.22
Zapada Oregonensis Gr.              28     4.87
Baetis                              27     4.70
SUBTOTAL 5 DOMINANTS               312    54.27
Drunella doddsi                     25     4.35
Zapada columbiana                   22     3.83
Micrasema                           20     3.48
Parapsyche                          18     3.13
Turbellaria                         14     2.43
TOTAL 10 DOMINANTS                 411    71.49

SAPROBIC INDICES
Hilsenhoff Biotic Index                =   1.51
Biotic Condition Index
   Community Tolerance Quotient (a) =  44.78
   Community Tolerance Quotient (d) =  70.00

DIVERSITY MEASURES
Shannon H (loge) =  2.82
Shannon H (log2) =  4.07
Evenness         =   .76
Brillouin H      =  2.70
Simpson D        =   .12

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine        61    10.65
Univoltine         464    80.83
Semivoltine         49     8.52

INDICATOR ASSEMBLAGES
ASSEMBLAGE                 ABUNDANCE     PERCENT
  A                                0         .00
  B                                0         .00
  C                                0         .00
  D                                0         .00
  E                                0         .00
  F                                0         .00
  G                                0         .00
  H                                0         .00
  I                                0         .00
  J                                0         .00

 End of report.
```

Lake Fork Rock Creek, August 22, 1990.
Montana, RBP Benthic Macroinvertebrate Sample.

RBP Level II File: 902LFRC A,B,C.

TOTAL ABUNDANCE = 580
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 456

TOTAL NUMBER OF TAXA = 22
Number EPT taxa = 18

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	1	4	.69
Odonata	0	0	.00
Ephemeroptera	8	348	60.01
Plecoptera	6	84	14.49
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	4	24	4.14
Lepidoptera	0	0	.00
Coleoptera	0	0	.00
Misc. Diptera	2	16	2.76
Chironomidae	1	104	17.93

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 4.38
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	8	72	12.42
Parasite	0	0	.00
Collector-gatherer	6	168	28.97
Collector-filterer	1	4	.69
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	0	0	.00
Scraper	3	184	31.73
Shredder	3	48	8.28
Xylophage	0	0	.00
Omnivore	0	0	.00
Unknown	1	104	17.93

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 46.00
Scraper/(Scraper + C.-filterer) = .98
Shredder/Total organisms = .083

Lake Fork Rock Creek, August 22, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA

TAXON	ABUNDANCE	PERCENT
Cinygmula	168	28.97
Baetis	112	19.31
Chironomidae	104	17.93
Zapada Oregonensis Gr.	28	4.83
Drunella doddsi	20	3.45
SUBTOTAL 5 DOMINANTS	432	74.49
Ameletus	20	3.45
Hesperoperla pacifica	20	3.45
Zapada columbiana	16	2.76
Doroneuria	12	2.07
Rhyacophila Brunnea Gr.	12	2.07
TOTAL 10 DOMINANTS	512	88.29

SAPROBIC INDICES

Hilsenhoff Biotic Index = 3.74

Biotic Condition Index

Community Tolerance Quotient (a) = 37.09

Community Tolerance Quotient (d) = 66.00

DIVERSITY MEASURES

Shannon H (loge) = 2.27

Shannon H (log2) = 3.28

Evenness = .73

Brillouin H = 2.20

Simpson D = .16

COMMUNITY VOLTINISM ANALYSIS

TYPE	ABUNDANCE	PERCENT
Multivoltine	162	27.93
Univoltine	370	63.79
Semivoltine	48	8.28

INDICATOR ASSEMBLAGES

ASSEMBLAGE	ABUNDANCE	PERCENT
A	0	.00
B	0	.00
C	0	.00
D	0	.00
E	0	.00
F	0	.00
G	0	.00
H	0	.00
I	0	.00
J	0	.00

End of report.

Pine Creek, July 26, 1990.
Montana, RBP Benthic Macroinvertebrate Sample.

RBP Level II File: 902PINE A,B,C.

TOTAL ABUNDANCE = 324
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 234

TOTAL NUMBER OF TAXA = 24
Number EPT taxa = 17

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	2	27	8.33
Odonata	0	0	.00
Ephemeroptera	6	40	12.36
Plecoptera	5	109	33.64
Hemiptera	0	0	.00
Megaloptera	0	0	.00
Trichoptera	6	85	26.24
Lepidoptera	0	0	.00
Coleoptera	1	4	1.23
Misc. Diptera	3	6	1.86
Chironomidae	1	53	16.36

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 4.42
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	7	17	5.25
Parasite	0	0	.00
Collector-gatherer	5	52	16.05
Collector-filterer	1	2	.62
Macrophyte-herbivore	1	17	5.25
Piercer-herbivore	0	0	.00
Scraper	4	79	24.39
Shredder	4	103	31.79
Xylophage	0	0	.00
Omnivore	1	1	.31
Unknown	1	53	16.36

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 39.50
Scraper/(Scraper + C.-filterer) = .98
Shredder/Total organisms = .318

```
Pine Creek, July 26, 1990 cont.


CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                           ABUNDANCE PERCENT
Yoraperla                            89     27.47
Neothremma                           61     18.83
Chironomidae                         53     16.36
Turbellaria                          26      8.02
Serratella                           18      5.56
SUBTOTAL 5 DOMINANTS                247     76.24
Micrasema                            17      5.25
Cinygma                              10      3.09
Zapada columbiana                     8      2.47
Epeorus grandis                       5      1.54
Zapada Oregonensis Gr.                5      1.54
TOTAL 10 DOMINANTS                  292     90.13

SAPROBIC INDICES
Hilsenhoff Biotic Index                  =   2.10
Biotic Condition Index
   Community Tolerance Quotient (a) =  45.35
   Community Tolerance Quotient (d) = 109.00

DIVERSITY MEASURES
Shannon H (loge) =  2.29
Shannon H (log2) =  3.30
Evenness         =   .72
Brillouin H      =  2.17
Simpson D        =   .15

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine        66     20.60
Univoltine         249     77.08
Semivoltine          7      2.31

INDICATOR ASSEMBLAGES
ASSEMBLAGE                 ABUNDANCE     PERCENT
  A                                0         .00
  B                                0         .00
  C                                0         .00
  D                                0         .00
  E                                0         .00
  F                                0         .00
  G                                0         .00
  H                                0         .00
  I                                0         .00
  J                                0         .00

 End of report.
```

Stone Creek, August 30, 1990.
Montana, RBP Benthic Macroinvertebrate Sample.

```
RBP Level II   File: 902STON  A,B,C.


TOTAL ABUNDANCE =    425
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance =    407

TOTAL NUMBER OF TAXA =   37
Number EPT taxa =   31

TAXONOMIC GROUP COMPOSITION
GROUP              #TAXA ABUNDANCE PERCENT
Misc. Taxa            3        10     2.36
Odonata               0         0      .00
Ephemeroptera        10       229    53.89
Plecoptera           10       110    25.89
Hemiptera             0         0      .00
Megaloptera           0         0      .00
Trichoptera          11        68    16.01
Lepidoptera           0         0      .00
Coleoptera            1         6     1.41
Misc. Diptera         2         2      .48
Chironomidae          0         0      .00

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae undefined - Chiron. = 0
Hydropsychidae/Total Trichoptera =    .00

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION
GROUP                  #TAXA  ABUNDANCE PERCENT
Predator                 11         63    14.83
Parasite                  0          0      .00
Collector-gatherer        8         59    13.89
Collector-filterer        1          1      .24
Macrophyte-herbivore      0          0      .00
Piercer-herbivore         0          0      .00
Scraper                   6        186    43.77
Shredder                  7         91    21.42
Xylophage                 0          0      .00
Omnivore                  3         21     4.95
Unknown                   1          4      .94

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer          =  186.00
Scraper/(Scraper + C.-filterer)     =     .99
Shredder/Total organisms            =    .214
```

```
Stone Creek, August 30, 1990 cont.


CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                        ABUNDANCE PERCENT
Epeorus albertae                  53     12.47
Epeorus grandis                   52     12.24
Yoraperla                         46     10.82
Rhithrogena                       42      9.88
Zapada columbiana                 32      7.53
SUBTOTAL 5 DOMINANTS             225     52.94
Cinygmula                         31      7.29
Ecclisomyia                       19      4.47
Drunella doddsi                   18      4.24
Parapsyche                        14      3.29
Baetis                            13      3.06
TOTAL 10 DOMINANTS               320     75.29

SAPROBIC INDICES
Hilsenhoff Biotic Index                  =   1.32
Biotic Condition Index
   Community Tolerance Quotient (a) =  41.84
   Community Tolerance Quotient (d) =  79.00

DIVERSITY MEASURES
Shannon H (loge) =  2.95
Shannon H (log2) =  4.26
Evenness         =   .82
Brillouin H      =  2.80
Simpson D        =   .07

COMMUNITY VOLTINISM ANALYSIS
TYPE           ABUNDANCE PERCENT
Multivoltine         18     4.41
Univoltine          373    87.94
Semivoltine          32     7.65

INDICATOR ASSEMBLAGES
ASSEMBLAGE                 ABUNDANCE     PERCENT
  A                             0           .00
  B                             0           .00
  C                             0           .00
  D                             0           .00
  E                             0           .00
  F                             0           .00
  G                             0           .00
  H                             0           .00
  I                             0           .00
  J                             0           .00

 End of report.
```

S.F. Sun River, Sept 12, 1990.
Montana, RBP Benthic Macroinvertebrate Sample.

```
RBP Level II   File: 902 SUN  A,B,C.


TOTAL ABUNDANCE =    916
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance =    762

TOTAL NUMBER OF TAXA =   33
Number EPT taxa =   25

TAXONOMIC GROUP COMPOSITION
GROUP            #TAXA ABUNDANCE PERCENT
Misc. Taxa          1         2      .22
Odonata             0         0      .00
Ephemeroptera       9       538    58.72
Plecoptera          7       130    14.20
Hemiptera           0         0      .00
Megaloptera         0         0      .00
Trichoptera         9        94    10.26
Lepidoptera         1         4      .44
Coleoptera          1         8      .87
Misc. Diptera       3        16     1.75
Chironomidae        2       124    13.54

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae                  =   6.15
Hydropsychidae/Total Trichoptera =     .00

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION
GROUP                #TAXA  ABUNDANCE PERCENT
Predator               14        184    20.09
Parasite                0          0      .00
Collector-gatherer      7        314    34.27
Collector-filterer      1          2      .22
Macrophyte-herbivore    0          0      .00
Piercer-herbivore       1         22     2.40
Scraper                 5        236    25.76
Shredder                2         50     5.46
Xylophage               0          0      .00
Omnivore                1          2      .22
Unknown                 2        106    11.58

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer         =  118.00
Scraper/(Scraper + C.-filterer)    =     .99
Shredder/Total organisms           =    .055
```

```
S.F. Sun River, Sept 12, 1990 cont.


CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Drunella doddsi                 212    23.14
Rhithrogena                     166    18.12
Chironomidae                    102    11.14
Epeorus longimanus               44     4.80
Zapada Oregonensis Gr.           44     4.80
SUBTOTAL 5 DOMINANTS            568    62.00
Baetis                           34     3.71
Perlodidae                       32     3.49
Rhyacophila Brunnea Gr.          32     3.49
Drunella grandis                 30     3.28
Brachycentrus                    30     3.28
TOTAL 10 DOMINANTS              726    79.25

SAPROBIC INDICES
Hilsenhoff Biotic Index                =   1.52
Biotic Condition Index
   Community Tolerance Quotient (a) =  41.03
   Community Tolerance Quotient (d) =  63.00

DIVERSITY MEASURES
Shannon H (loge) =  2.67
Shannon H (log2) =  3.86
Evenness         =   .76
Brillouin H      =  2.60
Simpson D        =   .11

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine       120    13.16
Univoltine         734    80.19
Semivoltine         61     6.66

INDICATOR ASSEMBLAGES
ASSEMBLAGE                  ABUNDANCE     PERCENT
  A                                 0         .00
  B                                 0         .00
  C                                 0         .00
  D                                 0         .00
  E                                 0         .00
  F                                 0         .00
  G                                 0         .00
  H                                 0         .00
  I                                 0         .00
  J                                 0         .00

 End of report.
```

Wisconson Creek, August 4, 1990.
Montana, RBP Benthic Macroinvertebrate Sample.

```
RBP Level II   File: 902WIS  A,B,C.


TOTAL ABUNDANCE =    850
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance =    698

TOTAL NUMBER OF TAXA =   31
Number EPT taxa =   17

TAXONOMIC GROUP COMPOSITION
GROUP               #TAXA ABUNDANCE PERCENT
Misc. Taxa              5        46     5.42
Odonata                 0         0      .00
Ephemeroptera           5       120    14.12
Plecoptera              6       174    20.48
Hemiptera               0         0      .00
Megaloptera             0         0      .00
Trichoptera             6       404    47.54
Lepidoptera             0         0      .00
Coleoptera              2         4      .48
Misc. Diptera           5        26     3.07
Chironomidae            2        76     8.94

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae                     =   9.18
Hydropsychidae/Total Trichoptera =        .00

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION
GROUP                    #TAXA  ABUNDANCE PERCENT
Predator                     9         70     8.25
Parasite                     1          6      .71
Collector-gatherer           8        128    15.07
Collector-filterer           1          4      .47
Macrophyte-herbivore         0          0      .00
Piercer-herbivore            1         16     1.88
Scraper                      4        398    46.83
Shredder                     4        154    18.13
Xylophage                    0          0      .00
Omnivore                     2         14     1.65
Unknown                      1         60     7.06

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer           =    99.50
Scraper/(Scraper + C.-filterer)      =      .99
Shredder/Total organisms             =     .181
```

```
Wisconson Creek, August 4, 1990 cont.


CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                         ABUNDANCE PERCENT
Neothremma alicia                   362   42.59
Zapada columbiana                   138   16.24
Ameletus                             76    8.94
Chironomidae                         60    7.06
Turbellaria                          28    3.29
SUBTOTAL 5 DOMINANTS                664   78.12
Rhyacophila Iranda Gr.               24    2.82
Cinygma                              22    2.59
Cricotopus Nostococladius            16    1.88
Cinygmula                            12    1.41
Tipula                               12    1.41
TOTAL 10 DOMINANTS                  750   88.23

SAPROBIC INDICES
Hilsenhoff Biotic Index                  =   1.43
Biotic Condition Index
   Community Tolerance Quotient (a) =  59.55
   Community Tolerance Quotient (d) = 115.00

DIVERSITY MEASURES
Shannon H (loge) =  2.16
Shannon H (log2) =  3.12
Evenness         =   .63
Brillouin H      =  2.09
Simpson D        =   .22

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine         99   11.65
Univoltine          722   84.94
Semivoltine          29    3.41

INDICATOR ASSEMBLAGES
ASSEMBLAGE                    ABUNDANCE     PERCENT
  A                                   0         .00
  B                                   0         .00
  C                                   0         .00
  D                                   0         .00
  E                                   0         .00
  F                                   0         .00
  G                                   0         .00
  H                                   0         .00
  I                                   0         .00
  J                                   0         .00

 End of report.
```

Box Elder Creek, Riffle, July 18, 1990. Montana, RBP Benthic Macroinvertebrate Sample.

RBP Level II File: 902BOXR A,B,C

TOTAL ABUNDANCE = 314
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 172

TOTAL NUMBER OF TAXA = 18
Number EPT taxa = 9

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	3	7	2.24
Odonata	1	12	3.82
Ephemeroptera	6	122	38.86
Plecoptera	0	0	.00
Hemiptera	1	22	7.01
Megaloptera	1	3	.96
Trichoptera	3	50	15.92
Lepidoptera	1	1	.32
Coleoptera	1	1	.32
Misc. Diptera	0	0	.00
Chironomidae	1	96	30.57

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 1.79
Hydropsychidae/Total Trichoptera = .00

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	4	27	8.60
Parasite	0	0	.00
Collector-gatherer	6	45	14.34
Collector-filterer	1	2	.64
Macrophyte-herbivore	0	0	.00
Piercer-herbivore	1	39	12.42
Scraper	3	82	26.12
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	1	1	.32
Unknown	2	118	37.58

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = 41.00
Scraper/(Scraper + C.-filterer) = .98
Shredder/Total organisms = .000

```
Box Elder Creek, Riffle, July 18, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Chironomidae                   96     30.57
Stenonema                      79     25.16
Hydroptilidae                  39     12.42
Caenis                         24      7.64
Corixidae                      22      7.01
SUBTOTAL 5 DOMINANTS          260     82.80
Coenagrionidae                 12      3.82
Polycentropus                  10      3.18
Callibaetis                     9      2.87
Leptophlebia                    6      1.91
Physidae                        3       .96
TOTAL 10 DOMINANTS            300     95.54

SAPROBIC INDICES
Hilsenhoff Biotic Index             =    5.84
Biotic Condition Index
   Community Tolerance Quotient (a) =  84.12
   Community Tolerance Quotient (d) = 164.00

DIVERSITY MEASURES
Shannon H (loge) =  2.04
Shannon H (log2) =  2.94
Evenness         =   .70
Brillouin H      =  1.94
Simpson D        =   .18

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine      114     36.31
Univoltine        199     63.38
Semivoltine         1       .32

INDICATOR ASSEMBLAGES
ASSEMBLAGE              ABUNDANCE    PERCENT
  A                             0         .00
  B                             0         .00
  C                             0         .00
  D                             0         .00
  E                             0         .00
  F                             0         .00
  G                             0         .00
  H                             0         .00
  I                             0         .00
  J                             0         .00

 End of report.
```

Larb Creek, near mouth, near Saco, July 17, 1990. Montana, RBP Benthic Macroinvertebrate Sample.

```
RBP Level II   File: 902LAR  A,B,C.


TOTAL ABUNDANCE =   1316
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance =    148

TOTAL NUMBER OF TAXA =   23
Number EPT taxa =    5

TAXONOMIC GROUP COMPOSITION
GROUP           #TAXA ABUNDANCE PERCENT
Misc. Taxa         8       772    58.66
Odonata            2       104     7.90
Ephemeroptera      2       128     9.73
Plecoptera         0         0      .00
Hemiptera          3       220    16.72
Megaloptera        0         0      .00
Trichoptera        3        20     1.52
Lepidoptera        0         0      .00
Coleoptera         3        16     1.21
Misc. Diptera      1         8      .61
Chironomidae       1        48     3.65

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae                  =   3.08
Hydropsychidae/Total Trichoptera =     .20

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION
GROUP               #TAXA  ABUNDANCE PERCENT
Predator               8        156    11.85
Parasite               1         28     2.13
Collector-gatherer     7        456    34.65
Collector-filterer     2         32     2.43
Macrophyte-herbivore   1          4      .30
Piercer-herbivore      0          0      .00
Scraper                1        376    28.57
Shredder               0          0      .00
Xylophage              0          0      .00
Omnivore               1          8      .61
Unknown                2        256    19.46

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer        =   11.75
Scraper/(Scraper + C.-filterer)   =     .92
Shredder/Total organisms          =    .000
```

```
Larb Creek, near mouth, near Saco, July 17, 1990 cont.


CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                          ABUNDANCE PERCENT
Planorbidae                          376   28.57
Corixidae                            208   15.81
Physidae                             196   14.89
Coenagrionidae                        96    7.29
Oligochaeta                           72    5.47
SUBTOTAL 5 DOMINANTS                 948   72.03
Callibaetis                           72    5.47
Caenis                                56    4.26
Hyallela azteca                       48    3.65
Chironomidae                          48    3.65
Cladocera                             28    2.13
TOTAL 10 DOMINANTS                  1200   91.19

SAPROBIC INDICES
Hilsenhoff Biotic Index                 =   7.08
Biotic Condition Index
   Community Tolerance Quotient (a) =  95.55
   Community Tolerance Quotient (d) = 195.00

DIVERSITY MEASURES
Shannon H (loge) =  2.32
Shannon H (log2) =  3.35
Evenness         =   .74
Brillouin H      =  2.28
Simpson D        =   .15

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine      165    12.54
Univoltine       1087    82.60
Semivoltine        64     4.86

INDICATOR ASSEMBLAGES
ASSEMBLAGE                  ABUNDANCE    PERCENT
  A                                 0        .00
  B                                 0        .00
  C                                 0        .00
  D                                 0        .00
  E                                 0        .00
  F                                 0        .00
  G                                 0        .00
  H                                 0        .00
  I                                 0        .00
  J                                 0        .00

 End of report.
```

Tule Creek at Hwy.13, RBP 05-1, August 23, 1990. Montana, RBP Benthic Macroinvertebrate Sample.

```
RBP Level II   File: 902TUL1  A,B,C.


TOTAL ABUNDANCE =    1516
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance =     108

TOTAL NUMBER OF TAXA =    19
Number EPT taxa =    4

TAXONOMIC GROUP COMPOSITION
GROUP              #TAXA ABUNDANCE  PERCENT
Misc. Taxa           8       784     51.70
Odonata              1       184     12.14
Ephemeroptera        4       108      7.12
Plecoptera           0         0       .00
Hemiptera            2        68      4.49
Megaloptera          0         0       .00
Trichoptera          0         0       .00
Lepidoptera          0         0       .00
Coleoptera           2       100      6.60
Misc. Diptera        1         4       .26
Chironomidae         1       268     17.68

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae                         =    .40
Hyd./Total Tri. undefined - Total Tri. = 0

FUNCTIONAL FEEDING GROUP (FFG)
COMPOSITION
GROUP                  #TAXA  ABUNDANCE PERCENT
Predator                 4        224     14.78
Parasite                 0          0       .00
Collector-gatherer      10        848     55.92
Collector-filterer       1         40      2.64
Macrophyte-herbivore     1         92      6.07
Piercer-herbivore        0          0       .00
Scraper                  1          4       .26
Shredder                 0          0       .00
Xylophage                0          0       .00
Omnivore                 0          0       .00
Unknown                  2        308     20.32

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer          =      .10
Scraper/(Scraper + C.-filterer)     =      .09
Shredder/Total organisms            =     .000
```

```
Tule Creek at Hwy.13, RBP 05-1, August 23, 1990 cont.


CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                         ABUNDANCE PERCENT
Chironomidae                       268    17.68
Hyallela azteca                    240    15.83
Physidae                           220    14.51
Coenagrionidae                     184    12.14
Gammaridae                         176    11.61
SUBTOTAL 5 DOMINANTS              1088    71.77
Oligochaeta                         96     6.33
Haliplidae                          92     6.07
Callibaetis                         80     5.28
Cladocera                           40     2.64
Corixidae                           40     2.64
TOTAL 10 DOMINANTS                1436    94.73

SAPROBIC INDICES
Hilsenhoff Biotic Index                =   7.13
Biotic Condition Index
   Community Tolerance Quotient (a) =  93.79
   Community Tolerance Quotient (d) = 156.00

DIVERSITY MEASURES
Shannon H (loge) =  2.33
Shannon H (log2) =  3.36
Evenness         =   .79
Brillouin H      =  2.30
Simpson D        =   .12

COMMUNITY VOLTINISM ANALYSIS
TYPE         ABUNDANCE PERCENT
Multivoltine     307     20.25
Univoltine      1061     69.99
Semivoltine      148      9.76

INDICATOR ASSEMBLAGES
ASSEMBLAGE                 ABUNDANCE    PERCENT
  A                              0          .00
  B                              0          .00
  C                              0          .00
  D                              0          .00
  E                              0          .00
  F                              0          .00
  G                              0          .00
  H                              0          .00
  I                              0          .00
  J                              0          .00

 End of report.
```

Willow Creek at Hwy.2, RBP#1, August 20, 1990. Montana, RBP Benthic Macroinvertebrate Sample.

RBP Level II File: 902WIL1 A,B,C.

TOTAL ABUNDANCE = 12379
Ephemeroptera+Plecoptera+
Trichoptera (EPT) abundance = 2496

TOTAL NUMBER OF TAXA = 22
Number EPT taxa = 5

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Misc. Taxa	7	7616	61.52
Odonata	2	120	.96
Ephemeroptera	2	2272	18.36
Plecoptera	0	0	.00
Hemiptera	1	128	1.03
Megaloptera	0	0	.00
Trichoptera	3	224	1.80
Lepidoptera	0	0	.00
Coleoptera	2	40	.32
Misc. Diptera	4	160	1.28
Chironomidae	1	1819	14.69

RATIOS OF TAX. GROUP ABUNDANCES
EPT/Chironomidae = 1.37
Hydropsychidae/Total Trichoptera = .25

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDANCE	PERCENT
Predator	5	232	1.86
Parasite	0	0	.00
Collector-gatherer	7	7840	63.34
Collector-filterer	3	1792	14.47
Macrophyte-herbivore	1	8	.06
Piercer-herbivore	1	160	1.29
Scraper	1	384	3.10
Shredder	0	0	.00
Xylophage	0	0	.00
Omnivore	1	8	.06
Unknown	3	1955	15.78

RATIOS OF FFG ABUNDANCES
Scraper/Collector-filterer = .21
Scraper/(Scraper + C.-filterer) = .18
Shredder/Total organisms = .000

```
Willow Creek at Hwy.2, RBP#1, August 20, 1990 cont.

CONTRIBUTION OF 10 DOMINANT TAXA
TAXON                     ABUNDANCE PERCENT
Hyallela azteca              5192     41.94
Caenis                       2192     17.71
Chironomidae                 1819     14.69
Cladocera                    1664     13.44
Planorbidae                   384      3.10
SUBTOTAL 5 DOMINANTS        11251     90.88
Physidae                      232      1.87
Hydroptila                    160      1.29
Corixidae                     128      1.03
Coenagrionidae                112       .90
Copepoda                       96       .78
TOTAL 10 DOMINANTS          11979     96.75

SAPROBIC INDICES
Hilsenhoff Biotic Index             =   7.40
Biotic Condition Index
   Community Tolerance Quotient (a) =  94.91
   Community Tolerance Quotient (d) = 140.00

DIVERSITY MEASURES
Shannon H (loge) =  1.77
Shannon H (log2) =  2.55
Evenness         =   .57
Brillouin H      =  1.76
Simpson D        =   .25

COMMUNITY VOLTINISM ANALYSIS
TYPE          ABUNDANCE PERCENT
Multivoltine     3350     27.06
Univoltine       8980     72.55
Semivoltine        48       .39

INDICATOR ASSEMBLAGES
ASSEMBLAGE              ABUNDANCE    PERCENT
  A                            0         .00
  B                            0         .00
  C                            0         .00
  D                            0         .00
  E                            0         .00
  F                            0         .00
  G                            0         .00
  H                            0         .00
  I                            0         .00
  J                            0         .00

 End of report.
```

BENTHIC INVERTEBRATE TAXA CODING-1992 Version

File: CVTAXCOD

Aquatic Biology Associates, Bob Wisseman, Senior Scientist, 3490 NW Deer Run Rd., Corvallis, Oregon. 503-752-1568 FAX 503-754-2460.

The list of taxa and codes which follows documents values or classes for various attributes used in the calculation of community composition metrics. Given our current state of knowledge, it must be recognized that attribute values/classes for many taxa are crude and unrefined. This list and the metric programs will be updated on a periodic basis to incorporate new information.

Comments and suggestions on appropriate values/classes for taxa are always welcome.

Major taxonomic groups are listed in a rough phylogenetic order. Within the insect orders, families are listed alphabetically. Under families, genera are listed alphabetically.

CODE: This column of coding is for future integration with a relational database. It can be ignored.

TAXON: Most North American insect genera are listed here. Most North American species in some genera are also listed.

PRI: This is a three letter code assigning each taxa to a major taxonomic group (e.g. Plecoptera). It is necessary for the execution of the Fortran programs which calculate the metrics.

SEC: This is a 3 letter code assigning each taxa to a family. It is also necessary for the Fortran codes.

HBI: Hilsenhoff Biotic Index tolerance values range from 0-10; "11" designates an unknown value for a taxa. The Fortran programs will automatically exclude these taxa from the analysis. HBI tolerance values are derived from Bode (1988) Hilsenhoff (1987, 1988) and Plafkin et al. (1989). Values for many western North American taxa are unknown and have been tentatively assigned values here.

BCI: Biotic Condition Index tolerance values range from 2 to 108. As above, "110" designates an unknown value. Tolerance values are taken from Winget and Mangum (1979).

Functional Feeding Groups: For the 1992 version of the metric programs, it was possible only to designate each taxa in a single feeding group (e.g. as 100% collector-gatherer). In the future, it may be possible to program, so that taxa can be apportioned between feeding groups (e.g. 75% collector-gatherer and 25% scraper). For many taxa, this will allow a more realistic appraisal.

Most of the current FFG designations were adapted from Merritt & Cummins (1984). The personal experience of the author (particularly for the Trichoptera) was also utilized. A complete literature review is necessary to refine designations for many taxa.

Since feeding group designations could not be partitioned in the 1992 version of the metric programs, it was necessary to add an "Omnivore" group. Many taxa simply do not conform to a single group. An "Unknown" category is also used. Abbreviations are as follows:

PR	predator
PA	parasite
CG	collector-gatherer
CF	collector-filterer
MH	macrophyte herbivore
PH	piercer herbivore
SC	scraper
SH	shredder
XY	xylophage
OM	omnivore
UN	unknown

Voltinism: Voltinism refers to the length of time it takes a taxon to complete a generation. The 1992 version of the metric programs allows each taxa to be designated as:

MV	multivoltine	>1 generation per year
UN	univoltine	1 generation per year
SV	semivoltine	>1 year per generation

Taxa can be partitioned between these classes, e.g. 75% of the population is multivoltine and 25% is univoltine. The designations given for taxa in the 1992 version are preliminary.

BENTHIC INVERTEBRATE TAXA CODING

Robert W. Wisseman, 3490 NW Deer Run Rd., Corvallis, Oregon, 97330 (503) 752-1568.

MISC. TAXA-Non Insect

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
A001	Porifera	MIS	POR	11	110	0	0	0	100	0	0	0	0	0	0	0	0	50	50
A100	Hydridae	MIS	HYR	5	108	100	0	0	0	0	0	0	0	0	0	0	50	50	0
A110	*Hydra*	MIS	HYR	5	108	100	0	0	0	0	0	0	0	0	0	0	50	50	0
A150	Turbellaria	MIS	TUR	4	108	0	0	100	0	0	0	0	0	0	0	0	100	0	0
A200	Planariidae	MIS	TUR	6	108	0	0	100	0	0	0	0	0	0	0	0	100	0	0
A210	*Dugesia*	MIS	TUR	6	108	0	0	100	0	0	0	0	0	0	0	0	100	0	0
A300	Nematoda	MIS	NMA	5	108	0	0	0	0	0	0	0	0	0	100	0	100	0	0
A400	Nematomorpha	MIS	NMT	11	110	0	100	0	0	0	0	0	0	0	0	0	100	0	0
A500	Bryozoa	MIS	BRY	11	110	0	0	0	100	0	0	0	0	0	0	0	100	0	0
A600	Nemertinea	MIS	NEA	8	110	100	0	0	0	0	0	0	0	0	0	0	0	100	0
A700	Polychaeta	MIS	PCH	11	110	0	0	0	0	0	0	0	0	0	0	100	0	100	0
A750	*Manayunkia speciosa*	MIS	PCH	6	110	0	0	0	0	0	0	0	0	0	0	100	0	100	0
B000	Oligochaeta	MIS	OLG	5	108	0	0	100	0	0	0	0	0	0	0	0	0	50	50
B005	Enchytraeidae	MIS	ENC	10	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B010	Naididae	MIS	NAI	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B110	*Allonais*	MIS	NAI	11	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B120	*Amphichaeta*	MIS	NAI	11	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B130	*Arcteonais*	MIS	NAI	11	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B140	*Bratislavia*	MIS	NAI	11	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B150	*Chaetogaster*	MIS	NAI	6	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B170	*Dero*	MIS	NAI	10	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B200	*Haemonais*	MIS	NAI	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B210	*Homochaeta*	MIS	NAI	11	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B220	*Nais*	MIS	NAI	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B250	*Ophodonais*	MIS	NAI	6	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B260	*Parnais*	MIS	NAI	11	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B270	*Piguetiella*	MIS	NAI	11	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B280	*Pristina*	MIS	NAI	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B320	*Ripistes*	MIS	NAI	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B330	*Slavina*	MIS	NAI	6	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B340	*Specaria*	MIS	NAI	6	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B350	*Stephensoniana*	MIS	NAI	11	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B360	*Stylaria*	MIS	NAI	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B370	*Uncinais*	MIS	NAI	11	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B380	*Vejdovskyella*	MIS	NAI	4	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B450	Tubificidae	MIS	TUB	9	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B455	Imma. Tubificid with cap. setae	MIS	TUB	9	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B460	Imma. Tubificid w/o cap. setae	MIS	TUB	9	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B510	*Arctodrilus*	MIS	TUB	11	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B520	*Aulodrilus*	MIS	TUB	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B530	*Bothrioneurum*	MIS	TUB	11	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B540	*Branchiura*	MIS	TUB	10	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B545	*Branchiura sowerbyi*	MIS	TUB	10	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B550	*Haber*	MIS	TUB	11	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B560	*Ilyodrilus*	MIS	TUB	10	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B580	*Isochaetides*	MIS	TUB	10	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B600	*Limnodrilus*	MIS	TUB	10	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B650	*Monopylephorus*	MIS	TUB	11	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B660	*Phallodrilus*	MIS	TUB	11	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B670	*Potamothrix*	MIS	TUB	11	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B690	*Psammoryctides*	MIS	TUB	11	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B710	*Quistadrilus*	MIS	TUB	10	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B720	*Rhizodrilus*	MIS	TUB	11	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B730	*Rhyacodrilus*	MIS	TUB	11	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B740	*Spirosperma*	MIS	TUB	10	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B760	*Telmatodrilus*	MIS	TUB	11	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B770	*Tubifex*	MIS	TUB	11	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B800	*Varichaetadrilus*	MIS	TUB	11	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B950	Lumbriculidae	MIS	LUM	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B960	*Lumbriculus*	MIS	LUM	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
B970	*Stylodrilus heringianus*	MIS	LUM	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
C010	Hirudinea	MIS	HIR	10	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
C100	Acanthobdellidae	MIS	HIR	11	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
C200	Erpobdellidae	MIS	HIR	11	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
C300	Glossiphoniidae	MIS	HIR	6	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
C400	*Helobdella*	MIS	HIR	6	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
C450	*Helobdella stagnalis*	MIS	HIR	6	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
C500	Hirudinidae	MIS	HIR	11	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
C600	Piscicolidae	MIS	HIR	11	108	0	100	0	0	0	0	0	0	0	0	0	0	100	0
D001	Pelecypoda	MIS	PEL	11	108	0	0	0	100	0	0	0	0	0	0	0	0	25	75
D050	Sphaeriidae	MIS	PEL	8	108	0	0	100	0	0	0	0	0	0	0	0	0	50	50
D101	*Musculium*	MIS	PEL	8	108	0	0	100	0	0	0	0	0	0	0	0	0	50	50
D110	*Pisidium*	MIS	PEL	8	108	0	0	100	0	0	0	0	0	0	0	0	0	50	50
D120	*Pisidium (C.) compressum*	MIS	PEL	8	108	0	0	100	0	0	0	0	0	0	0	0	0	50	50
D130	*Pisidium (C.) milium*	MIS	PEL	8	108	0	0	100	0	0	0	0	0	0	0	0	0	50	50
D150	*Sphaerium*	MIS	PEL	8	108	0	0	100	0	0	0	0	0	0	0	0	0	50	50
D170	*Sphaerium (S.) simile*	MIS	PEL	8	108	0	0	100	0	0	0	0	0	0	0	0	0	50	50
D190	Corbiculidae	MIS	PEL	11	108	0	0	0	100	0	0	0	0	0	0	0	0	0	100
D195	*Corbicula*	MIS	PEL	11	108	0	0	0	100	0	0	0	0	0	0	0	0	0	100
D200	Unionidae	MIS	PEL	11	108	0	0	0	100	0	0	0	0	0	0	0	0	0	100
D210	*Anodonta*	MIS	PEL	6	108	0	0	0	100	0	0	0	0	0	0	0	0	0	100
D240	*Elliptio*	MIS	PEL	8	108	0	0	0	100	0	0	0	0	0	0	0	0	0	100
D270	*Gonidea*	MIS	PEL	4	108	0	0	0	100	0	0	0	0	0	0	0	0	0	100
D300	*Lampsilis*	MIS	PEL	6	108	0	0	0	100	0	0	0	0	0	0	0	0	0	100
D350	Margaritiferidae	MIS	PEL	4	108	0	0	0	100	0	0	0	0	0	0	0	0	0	100
D360	*Margaritifera*	MIS	PEL	4	108	0	0	0	100	0	0	0	0	0	0	0	0	0	100
D400	Gastropoda	MIS	GAS	7	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D410	Ancylidae	MIS	GAS	6	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D420	*Ferrissia*	MIS	GAS	6	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D424	*Ferrissia parallelus*	MIS	GAS	6	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D427	*Ferrissia rivularis*	MIS	GAS	6	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D430	Hydrobiidae	MIS	GAS	8	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D435	*Amnicola*	MIS	GAS	8	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D450	*Bythynia*	MIS	GAS	8	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D460	*Fluminicola*	MIS	GAS	5	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D470	*Pomatiopsis*	MIS	GAS	8	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D480	*Probythinella*	MIS	GAS	8	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D500	Lymnaeidae	MIS	GAS	6	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
D510	*Fossaria*	MIS	GAS	6	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
D515	*Fossaria (B.)*	MIS	GAS	6	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
D520	*Fossaria (B.) bulimoides cockerell*	MIS	GAS	6	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
D530	*Fossaria (F.) modicella*	MIS	GAS	6	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
D540	*Lanx*	MIS	GAS	6	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
D550	*Lymnaea*	MIS	GAS	6	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
D570	*Radix*	MIS	GAS	6	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
D580	*Stagnicola*	MIS	GAS	6	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
D585	*Stagnicola (S.) elrodi*	MIS	GAS	6	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
D600	Physidae	MIS	GAS	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
D610	*Aplexa*	MIS	GAS	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
D640	*Physa*	MIS	GAS	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
D670	*Physella*	MIS	GAS	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
D673	*Pysella (Physella)*	MIS	GAS	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
D676	*Physella (P.) gyrina*	MIS	GAS	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
D679	*Physella lordi*	MIS	GAS	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
D682	*Physella propinqua nuttalli*	MIS	GAS	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
D690	Planorbidae	MIS	GAS	6	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D700	*Gyraulus*	MIS	GAS	8	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D710	*Gyraulus (Torquis)*	MIS	GAS	8	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D715	*Gyraulus (T.) parvus*	MIS	GAS	8	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D720	*Helisoma*	MIS	GAS	6	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D730	*Menetus*	MIS	GAS	6	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D735	*Menetus (M.) callioglyptus*	MIS	GAS	6	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D740	*Planorbella*	MIS	GAS	6	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D750	*Planorbula*	MIS	GAS	6	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D760	*Promenetus*	MIS	GAS	6	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D770	*Vorticifex*	MIS	GAS	6	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D800	Pleuroceridae	MIS	GAS	6	108	0	0	0	0	0	0	100	0	0	0	0	0	0	100
D810	*Goniobasis*	MIS	GAS	6	108	0	0	0	0	0	0	100	0	0	0	0	0	0	100
D830	*Juga*	MIS	GAS	7	108	0	0	0	0	0	0	100	0	0	0	0	0	0	100
D850	*Pleurocera*	MIS	GAS	6	108	0	0	0	0	0	0	100	0	0	0	0	0	0	100

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
D900	Valvatidaa	MIS	GAS	8	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D910	*Valvata*	MIS	GAS	8	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D920	*Valvata margella*	MIS	GAS	8	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D950	Viviparidaa	MIS	GAS	6	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D960	*Campeloma*	MIS	GAS	6	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
D970	*Viviparus*	MIS	GAS	6	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
	Crustacea																		
E001	Branchiopoda	MIS	BRA	11	108	0	0	100	0	0	0	0	0	0	0	0	100	0	0
E010	Anostraca	MIS	ANO	11	108	0	0	100	0	0	0	0	0	0	0	0	100	0	0
E040	Notostraca	MIS	NOS	11	108	0	0	100	0	0	0	0	0	0	0	0	100	0	0
E070	Conchostraca	MIS	CON	11	108	0	0	100	0	0	0	0	0	0	0	0	100	0	0
E100	Cladocera	MIS	CLA	8	108	0	0	0	100	0	0	0	0	0	0	0	100	0	0
E200	Copepoda	MIS	COP	8	108	0	0	100	0	0	0	0	0	0	0	0	100	0	0
E300	Ostracoda	MIS	OST	8	108	0	0	100	0	0	0	0	0	0	0	0	100	0	0
E400	Mysidacea	MIS	MYS	11	108	0	0	0	100	0	0	0	0	0	0	0	0	0	100
E450	Amphipoda	MIS	AMP	4	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
E500	Gammaridaa	MIS	AMP	6	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
E530	*Anisogammarus*	MIS	AMP	4	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
E550	*Gammarus*	MIS	AMP	6	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
E580	*Gammarus pseudolimnaeus*	MIS	AMP	4	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
E650	Talitridaa	MIS	AMP	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
E660	*Hyallela azteca*	MIS	AMP	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
E700	Isopoda	MIS	ISO	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
E710	*Asellus*	MIS	ISO	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
E730	*Asellus occidentalis*	MIS	ISO	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
E750	*Cyathura*	MIS	ISO	5	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
E780	*Chiridotaa*	MIS	ISO	5	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
E800	Decapoda	MIS	DEC	6	108	0	0	0	0	0	0	0	0	0	100	0	0	0	100
E810	Astacidaa	MIS	DEC	6	108	0	0	0	0	0	0	0	0	0	100	0	0	0	100
E820	*Orconactes*	MIS	DEC	6	108	0	0	0	0	0	0	0	0	0	100	0	0	0	100
E850	*Pacifasticus connectens*	MIS	DEC	6	108	0	0	0	0	0	0	0	0	0	100	0	0	0	100
E860	*Pacifasticus leniusculus*	MIS	DEC	6	108	0	0	0	0	0	0	0	0	0	100	0	0	0	100
E900	*Procambarus*	MIS	DEC	6	108	0	0	0	0	0	0	0	0	0	100	0	0	0	100
F000	Acari	MIS	ACA	5	108	0	100	0	0	0	0	0	0	0	0	0	100	0	0
	Insecta																		
F700	Collembola	MIS	CBL	5	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
G000	Odonata	ODO	ODO	11	110	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G001	Anisoptera	ODO	ANI	11	110	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G010	Aeshnidaa	ODO	AES	3	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G020	*Aeshna*	ODO	AES	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G030	*Anax*	ODO	AES	8	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G040	*Basiaeschna*	ODO	AES	6	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G050	*Boyeria*	ODO	AES	2	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G100	Cordulegatridae	ODO	CDU	3	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G110	*Cordulagastar*	ODO	CDU	3	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G150	Gomphidae	ODO	GOM	4	108	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G210	*Gomphus*	ODO	GOM	5	108	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G220	*Lanthus*	ODO	GOM	4	108	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G230	*Octogomphus*	ODO	GOM	4	108	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G240	*Ophiogomphus*	ODO	GOM	4	108	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G250	*Progomphus*	ODO	GOM	4	108	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G260	*Stylurus*	ODO	GOM	4	108	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G300	Libellulidae	ODO	LIB	9	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G310	*Belonia*	ODO	LIB	9	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G320	*Erythemis*	ODO	LIB	9	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G340	*Ladona*	ODO	LIB	9	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G350	*Leucorrhinia*	ODO	LIB	9	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G360	*Libellula*	ODO	LIB	9	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G370	*Macromia*	ODO	LIB	2	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G380	*Neurocordulia*	ODO	LIB	2	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G390	*Pachydiplax*	ODO	LIB	9	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G400	*Pantala*	ODO	LIB	9	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G410	*Perithemis*	ODO	LIB	9	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G420	*Plathemis*	ODO	LIB	9	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G430	*Sympetrum*	ODO	LIB	10	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G440	*Tramea*	ODO	LIB	9	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G450	Macromiidae	ODO	MAC	2	110	100	0	0	0	0	0	0	0	0	0	0	0	0	100
G470	*Macromia*	ODO	MAC	2	110	100	0	0	0	0	0	0	0	0	0	0	0	0	100

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
G501	Zygoptera	ODO	ZYG	8	110	100	0	0	0	0	0	0	0	0	0	0	0	100	0
G510	Calopterygidae	ODO	CAL	5	110	100	0	0	0	0	0	0	0	0	0	0	0	100	0
G530	*Calopteryx*	ODO	CAL	5	110	100	0	0	0	0	0	0	0	0	0	0	0	100	0
G570	*Hetaerina*	ODO	CAL	6	110	100	0	0	0	0	0	0	0	0	0	0	0	100	0
G600	Coenagrionidae	ODO	COE	9	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
G610	*Amphiagrion*	ODO	COE	9	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
G620	*Argia*	ODO	COE	7	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
G640	*Coenagrion*	ODO	COE	8	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
G660	*Enallagma*	ODO	COE	9	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
G665	*Enallagma boreale*	ODO	COE	9	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
G700	*Ischnura*	ODO	COE	9	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
G710	*Ischnura cervula*	ODO	COE	9	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
G750	*Zoniagrion*	ODO	COE	9	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
G800	Lestidae	ODO	LES	9	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
G810	*Archilestes*	ODO	LES	9	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
G850	*Lestes*	ODO	LES	9	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
H001	Ephemeroptera	EPH	EPH	11	72	0	0	0	0	0	0	0	0	0	0	100	0	100	0
H010	Ametropodidae	EPH	AME	11	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H012	*Ametropus*	EPH	AME	11	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H020	Baetidae	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H024	*Acentrella*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H026	*Acentrella ampla*	EPH	BAE	6	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H028	*Acentrella carolina*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H030	*Acentrella insignificans*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H032	*Acentrella lapponica*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H034	*Acentrella turbida*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H040	*Acerpenna*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H042	*Acerpenna akataleptos*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H044	*Acerpenna harti*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H046	*Acerpenna macdunnoughi*	EPH	BAE	5	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H048	*Acerpenna pygmaea*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H050	*Apobaetis*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H052	*Apobaetis etowah*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H054	*Apobaetis indeprensus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H060	*Baetis*	EPH	BAE	5	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H062	*Baetis adonis*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H064	*Baetis alachua*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H066	*Baetis alius*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H068	*Baetis armillatus*	EPH	BAE	2	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H070	*Baetis bicaudatus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H072	*Baetis bimaculatus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H074	*Baetis brunneicolor*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H076	*Baetis caelestis*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H078	*Baetis caurinus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H080	*Baetis cinctutus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H082	*Baetis dardanus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H084	*Baetis diablus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H086	*Baetis dubius*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H088	*Baetis elliotti*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H090	*Baetis ephippiatus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H092	*Baetis flavistriga*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H094	*Baetis foemina*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H096	*Baetis frondalis*	EPH	BAE	5	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H098	*Baetis futile*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H100	*Baetis hudsonicus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H102	*Baetis intercalaris*	EPH	BAE	6	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H104	*Baetis longipalpus*	EPH	BAE	5	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H106	*Baetis macani bundyae*	EPH	BAE	5	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H108	*Baetis magnus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H110	*Baetis moffati*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H112	*Baetis notos*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H114	*Baetis ochris*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H116	*Baetis palisadi*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H118	*Baetis parallelus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H120	*Baetis persecutus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H122	*Baetis piscatoris*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H124	*Baetis pluto*	EPH	BAE	6	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H126	*Baetis posticatus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H128	*Baetis propinquus*	EPH	BAE	6	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
H130	*Baetis punctiventris*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H132	*Baetis rubrolaterale*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H134	*Baetis rusticans*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H136	*Baetis sinuosus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H138	*Baetis sulfurosus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H140	*Baetis thermophilos*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H142	*Baetis tricaudatus*	EPH	BAE	6	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H144	*Baetis veteris*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H146	*Baetis virile*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H150	*Baetodes*	EPH	BAE	4	72	0	0	0	0	0	0	100	0	0	0	0	75	25	0
H152	*Baetodes arizonensis*	EPH	BAE	4	72	0	0	0	0	0	0	100	0	0	0	0	75	25	0
H154	*Baetodes edmundsi*	EPH	BAE	4	72	0	0	0	0	0	0	100	0	0	0	0	75	25	0
H156	*Baetodes inermis*	EPH	BAE	4	72	0	0	0	0	0	0	100	0	0	0	0	75	25	0
H158	*Baetodes tritus*	EPH	BAE	4	72	0	0	0	0	0	0	100	0	0	0	0	75	25	0
H170	*Barbaetis*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H172	*Barbaetis benfieldi*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H174	*Barbaetis cestus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H180	*Callibaetis*	EPH	BAE	9	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H182	*Callibaetis americanus*	EPH	BAE	9	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H184	*Callibaetis californicus*	EPH	BAE	9	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H186	*Callibaetis centralis*	EPH	BAE	9	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H188	*Callibaetis completa*	EPH	BAE	9	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H190	*Callibaetis ferrugineus*	EPH	BAE	9	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H192	*Callibaetis floridanus*	EPH	BAE	9	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H194	*Callibaetis fluctuans*	EPH	BAE	9	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H196	*Callibaetis montanus*	EPH	BAE	9	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H198	*Callibaetis pallidus*	EPH	BAE	9	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H200	*Callibaetis paulinus*	EPH	BAE	9	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H202	*Callibaetis pictus*	EPH	BAE	9	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H204	*Callibaetis pretiosus*	EPH	BAE	9	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H206	*Callibaetis skokianus*	EPH	BAE	9	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H208	*Callibaetis undatus*	EPH	BAE	9	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H220	*Camelobaetidius*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H222	*Camelobaetidius cepheus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H224	*Camelobaetidius mexicanus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H226	*Camelobaetidius navis*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H228	*Camelobaetidius salinus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H230	*Camelobaetidius sinaloa*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H232	*Camelobaetidius trivialis*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H234	*Camelobaetidius warreni*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H240	*Centroptilum*	EPH	BAE	2	36	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H242	*Centroptilum alamance*	EPH	BAE	2	36	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H244	*Centroptilum bifurcatum*	EPH	BAE	2	36	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H246	*Centroptilum selanderorum*	EPH	BAE	2	36	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H248	*Centroptilum semirufum*	EPH	BAE	2	36	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H250	*Centroptilum triangulifer*	EPH	BAE	2	36	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H252	*Centroptilum victoriae*	EPH	BAE	2	36	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H260	*Cloeodes*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H262	*Cloeodes consignatus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H264	*Cloeodes excogitatus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H266	*Cloeodes macrolamellus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H268	*Cloeodes maculipes*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H270	*Cloeodes peninsulus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H275	*Cloeon*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H277	*Cloeon cognatum*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H280	*Diphetor*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H282	*Diphetor devinctus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H284	*Diphetor hageni*	EPH	BAE	5	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H290	*Fallceon*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H292	*Fallceon quilleri*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H300	*Guajirolus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H310	*Heterocloeon*	EPH	BAE	4	72	0	0	0	0	0	0	100	0	0	0	0	75	25	0
H312	*Heterocloeon berneri*	EPH	BAE	4	72	0	0	0	0	0	0	100	0	0	0	0	75	25	0
H314	*Heterocloeon curiosum*	EPH	BAE	4	72	0	0	0	0	0	0	100	0	0	0	0	75	25	0
H316	*Heterocloeon frivolum*	EPH	BAE	4	72	0	0	0	0	0	0	100	0	0	0	0	75	25	0
H318	*Heterocloeon petersi*	EPH	BAE	4	72	0	0	0	0	0	0	100	0	0	0	0	75	25	0
H330	*Moribaetis*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H340	*Paracloeodes*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H342	*Paracloeodes minutus*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
H344	*Paracloeodes portoricensis*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H350	*Procloeon*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H352	*Procloeon album*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H354	*Procloeon asperatum*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H356	*Procloeon bellum*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H358	*Procloeon caliginosum*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H360	*Procloeon conturbatum*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H362	*Procloeon convexum*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H364	*Procloeon elsa*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H366	*Procloeon fragile*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H368	*Procloeon hobbsi*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H370	*Procloeon implicatum*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H372	*Procloeon inanum*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H374	*Procloeon ingens*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H376	*Procloeon insignificans*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H378	*Procloeon intermediale*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H380	*Procloeon mendax*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H382	*Procloeon minor*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H384	*Procloeon oreophilum*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H386	*Procloeon ozburni*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H388	*Procloeon pennulatum*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H390	*Procloeon quaesitum*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H392	*Procloeon rivulare*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H394	*Procloeon rubropictum*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H396	*Procloeon rufostrigatum*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H398	*Procloeon simile*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H400	*Procloeon simplex*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H402	*Procloeon venosum*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H404	*Procloeon vicinum*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H406	*Procloeon viridocularis*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H408	*Procloeon walshi*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H420	*Pseudocentroptiloides*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H425	*Pseudocentroptiloides usa*	EPH	BAE	4	72	0	0	100	0	0	0	0	0	0	0	0	75	25	0
H440	Baetiscidae	EPH	BAT	3	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H442	*Baetisca*	EPH	BAT	3	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H445	*Baetisca columbiana*	EPH	BAT	3	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H460	Behningiidae	EPH	BEH	11	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
H462	*Dolania*	EPH	BEH	11	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
H464	*Dolania americanum*	EPH	BEH	11	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
H468	Caenidae	EPH	CAE	7	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H470	*Amercaenis*	EPH	CAE	7	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H472	*Amercaenis ridens*	EPH	CAE	7	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H480	*Brachycercus*	EPH	CAE	3	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H490	*Caenis*	EPH	CAE	7	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H492	*Caenis amica*	EPH	CAE	7	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H494	*Caenis anceps*	EPH	CAE	7	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H496	*Caenis bajaensis*	EPH	CAE	7	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H498	*Caenis candida*	EPH	CAE	7	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H500	*Caenis diminuta*	EPH	CAE	7	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H502	*Caenis hilaris*	EPH	CAE	7	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H504	*Caenis latipennis*	EPH	CAE	7	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H506	*Caenis macafferti*	EPH	CAE	7	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H508	*Caenis punctata*	EPH	CAE	7	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H510	*Caenis simulans*	EPH	CAE	7	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H512	*Caenis tardata*	EPH	CAE	7	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H514	*Caenis youngi*	EPH	CAE	7	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H520	*Cercobrachys*	EPH	CAE	7	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H600	Ephemerellidae	EPH	EPM	1	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H630	*Attenella*	EPH	EPM	2	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H635	*Attenella delantala*	EPH	EPM	2	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H640	*Attenella margarita*	EPH	EPM	2	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H645	*Attenella soquele*	EPH	EPM	2	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H650	*Caudatella*	EPH	EPM	1	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H652	*Caudatella ?sp.*	EPH	EPM	1	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H655	*Caudatella cascadia*	EPH	EPM	1	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H660	*Caudatella edmundsi*	EPH	EPM	1	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H665	*Caudatella heterocaudata*	EPH	EPM	1	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H670	*Caudatella hystrix*	EPH	EPM	1	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H675	*Caudatella jacobi*	EPH	EPM	1	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
H680	*Danella*	EPH	EPM	2	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H700	*Drunella*	EPH	EPM	0	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H705	*Drunella coloradensis/flavilinea*	EPH	EPM	0	18	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H710	*Drunella doddsi*	EPH	EPM	0	4	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H715	*Drunella grandis*	EPH	EPM	0	24	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H720	*Drunella pelosa*	EPH	EPM	0	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H725	*Drunella spinifera*	EPH	EPM	0	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
H750	*Ephemerella*	EPH	EPM	1	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H755	*Ephemerella alleni*	EPH	EPM	1	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H760	*Ephemerella aurivillii*	EPH	EPM	0	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H765	*Ephemerella inermis*	EPH	EPM	1	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H770	*Ephemerella infrequens*	EPH	EPM	1	48	0	0	0	0	0	0	0	100	0	0	0	0	100	0
H775	*Ephemerella lacustris*	EPH	EPM	1	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H780	*Ephemerella verruca*	EPH	EPM	1	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H800	*Eurylophella*	EPH	EPM	11	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H805	*Eurylophella funeralis*	EPH	EPM	0	48	0	0	0	0	0	0	0	100	0	0	0	0	100	0
H810	*Eurylophella lodi*	EPH	EPM	11	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H850	*Serratella*	EPH	EPM	2	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H852	*Serratella ?sp.*	EPH	EPM	2	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H855	*Serratella micheneri*	EPH	EPM	2	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H860	*Serratella spiculosa*	EPH	EPM	2	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H865	*Serratella teresa*	EPH	EPM	2	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H870	*Serratella tibialis*	EPH	EPM	2	24	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H875	*Serratella velmae*	EPH	EPM	2	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H890	*Timpanoga hecuba*	EPH	EPM	7	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
H900	Ephemeridae	EPH	EPE	4	36	0	0	100	0	0	0	0	0	0	0	0	0	50	50
H910	*Ephemera*	EPH	EPE	4	36	0	0	100	0	0	0	0	0	0	0	0	0	50	50
H920	*Ephemera simulans*	EPH	EPE	1	36	0	0	100	0	0	0	0	0	0	0	0	0	50	50
H950	*Hexagenia*	EPH	EPE	6	36	0	0	100	0	0	0	0	0	0	0	0	0	50	50
H960	*Hexagenia limbata*	EPH	EPE	6	36	0	0	100	0	0	0	0	0	0	0	0	0	50	50
I001	Heptageniidae	EPH	HEP	4	48	0	0	0	0	0	0	100	0	0	0	0	0	100	0
I050	*Cinygma*	EPH	HEP	2	48	0	0	25	0	0	0	50	0	25	0	0	0	100	0
I055	*Cinygma dimicki*	EPH	HEP	2	48	0	0	25	0	0	0	50	0	25	0	0	0	100	0
I060	*Cinygma integrum*	EPH	HEP	2	48	0	0	25	0	0	0	50	0	25	0	0	0	100	0
I065	*Cinygma lyriformis*	EPH	HEP	2	48	0	0	25	0	0	0	50	0	25	0	0	0	100	0
I150	*Cinygmula*	EPH	HEP	4	21	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I160	*Cinygmula mimus*	EPH	HEP	4	21	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I165	*Cinygmula par*	EPH	HEP	4	21	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I170	*Cinygmula ramaleyi*	EPH	HEP	4	21	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I175	*Cinygmula reticulata*	EPH	HEP	4	21	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I180	*Cinygmula tarda*	EPH	HEP	4	21	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I200	*Epeorus*	EPH	HEP	0	21	0	0	50	0	0	0	50	0	0	0	0	0	100	0
I205	*Epeorus albertae*	EPH	HEP	1	21	0	0	50	0	0	0	50	0	0	0	0	0	100	0
I210	*Epeorus deceptivus*	EPH	HEP	0	21	0	0	50	0	0	0	50	0	0	0	0	0	100	0
I215	*Epeorus longimanus*	EPH	HEP	1	21	0	0	50	0	0	0	50	0	0	0	0	0	100	0
I220	*Epeorus grandis*	EPH	HEP	0	21	0	0	50	0	0	0	50	0	0	0	0	0	100	0
I225	*Epeorus permagnus*	EPH	HEP	0	21	0	0	50	0	0	0	50	0	0	0	0	0	100	0
I250	*Heptagenia*	EPH	HEP	4	48	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I255	*Heptagenia criddlei*	EPH	HEP	4	48	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I260	*Heptagenia elagantula*	EPH	HEP	4	48	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I265	*Heptagenia jewetti*	EPH	HEP	4	48	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I267	*Heptagenia kennedyi*	EPH	HEP	4	48	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I270	*Heptagenia otiosa*	EPH	HEP	4	48	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I272	*Heptagenia petersi*	EPH	HEP	4	48	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I275	*Heptagenia rodocki*	EPH	HEP	4	48	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I280	*Heptagenia rosea*	EPH	HEP	4	48	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I285	*Heptagenia solitaria*	EPH	HEP	4	48	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I300	*Ironodes*	EPH	HEP	3	48	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I305	*Ironodes arctus*	EPH	HEP	3	48	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I310	*Ironodes geminatus*	EPH	HEP	3	48	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I315	*Ironodes nitidus*	EPH	HEP	3	48	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I350	*Leucrocuta*	EPH	HEP	1	48	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I360	*Nixe*	EPH	HEP	2	48	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I370	*Nixe simplicioides*	EPH	HEP	2	48	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I400	*Pseudiron*	EPH	HEP	5	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
I420	*Rhithrogena*	EPH	HEP	0	21	0	0	50	0	0	0	50	0	0	0	0	0	100	0
I425	*Rhithrogena futilis*	EPH	HEP	0	21	0	0	50	0	0	0	50	0	0	0	0	0	100	0
I430	*Rhithrogena hageni*	EPH	HEP	0	21	0	0	50	0	0	0	50	0	0	0	0	0	100	0
I432	*Rhithrogena morrisoni*	EPH	HEP	0	21	0	0	50	0	0	0	50	0	0	0	0	0	100	0

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
I435	*Rhithrogena robusta*	EPH	HEP	0	21	0	0	50	0	0	0	50	0	0	0	0	0	100	0
I440	*Rhithrogena undulata*	EPH	HEP	0	21	0	0	50	0	0	0	50	0	0	0	0	0	100	0
I450	*Stenacron*	EPH	HEP	4	48	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I470	*Stenonema*	EPH	HEP	5	48	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I475	*Stenonema Pulchellum Gr.*	EPH	HEP	3	48	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I500	Leptophlebiidae	EPH	LPH	2	36	0	0	75	0	0	0	25	0	0	0	0	0	100	0
I510	*Choroterpes*	EPH	LPH	2	36	0	0	75	0	0	0	25	0	0	0	0	0	100	0
I515	*Chloroterpes albiannulata*	EPH	LPH	2	36	0	0	75	0	0	0	25	0	0	0	0	0	100	0
I530	*Habrophlebia*	EPH	LPH	4	36	0	0	75	0	0	0	25	0	0	0	0	0	100	0
I540	*Habrophlebiodes*	EPH	LPH	6	36	0	0	25	0	0	0	75	0	0	0	0	0	100	0
I550	*Leptophlebia*	EPH	LPH	4	24	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I560	*Leptophlebia gravastella*	EPH	LPH	4	24	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I565	*Leptophlebia nebulos*	EPH	LPH	4	24	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I570	*Leptophlebia pacifica*	EPH	LPH	4	24	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I600	*Paraleptophlebia*	EPH	LPH	4	24	0	0	75	0	0	0	0	25	0	0	0	0	100	0
I605	*Paraleptophlebia bicornuta*	EPH	LPH	4	24	0	0	75	0	0	0	0	25	0	0	0	0	100	0
I607	*Paraleptophlebia brunneipennis*	EPH	LPH	4	24	0	0	75	0	0	0	0	25	0	0	0	0	100	0
I610	*Paraleptophlebia debilis*	EPH	LPH	4	24	0	0	75	0	0	0	0	25	0	0	0	0	100	0
I612	*Paraleptophlebia facula*	EPH	LPH	4	24	0	0	75	0	0	0	0	25	0	0	0	0	100	0
I615	*Paraleptophlebia gregalis*	EPH	LPH	4	24	0	0	75	0	0	0	0	25	0	0	0	0	100	0
I617	*Paraleptophlebia heteronea*	EPH	LPH	4	24	0	0	75	0	0	0	0	25	0	0	0	0	100	0
I620	*Paraleptophlebia memorialis*	EPH	LPH	4	24	0	0	75	0	0	0	0	25	0	0	0	0	100	0
I625	*Paraleptophlebia rufivenosa*	EPH	LPH	4	24	0	0	75	0	0	0	0	25	0	0	0	0	100	0
I630	*Paraleptophlebia temporalis*	EPH	LPH	4	24	0	0	75	0	0	0	0	25	0	0	0	0	100	0
I635	*Paraleptophlebia vaciva*	EPH	LPH	4	24	0	0	75	0	0	0	0	25	0	0	0	0	100	0
I650	*Traverella*	EPH	LPH	4	36	0	0	0	100	0	0	0	0	0	0	0	0	100	0
I655	*Traverella albertana*	EPH	LPH	4	36	0	0	0	100	0	0	0	0	0	0	0	0	100	0
I700	Metretopodidae	EPH	MET	2	110	50	0	50	0	0	0	0	0	0	0	0	0	100	0
I705	*Metretopus*	EPH	MET	2	110	50	0	50	0	0	0	0	0	0	0	0	0	100	0
I710	*Metretopus borealis*	EPH	MET	2	110	50	0	50	0	0	0	0	0	0	0	0	0	100	0
I730	Neoephemeridae	EPH	NEO	11	110	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I735	*Neoephemera*	EPH	NEO	11	110	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I750	Oligoneuriidae	EPH	OLI	2	36	0	0	0	100	0	0	0	0	0	0	0	0	100	0
I770	*Lachlania*	EPH	OLI	2	36	0	0	0	100	0	0	0	0	0	0	0	0	100	0
I775	*Lachlania powelli*	EPH	OLI	2	36	0	0	0	100	0	0	0	0	0	0	0	0	100	0
I790	*Isonychia*	EPH	OLI	2	48	0	0	0	100	0	0	0	0	0	0	0	0	100	0
I800	*Isonychia sicca campestris*	EPH	OLI	2	48	0	0	0	100	0	0	0	0	0	0	0	0	100	0
I805	*Isonychia velma*	EPH	OLI	2	48	0	0	0	100	0	0	0	0	0	0	0	0	100	0
I820	Palingeniidae	EPH	PAL	11	110	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I825	*Pentagenia*	EPH	PAL	11	110	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I840	Polymitarcyidae	EPH	POL	2	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I845	*Ephoron*	EPH	POL	2	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I860	Potamanthidae	EPH	POT	4	110	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I865	*Potamanthus*	EPH	POT	4	110	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I880	Siphlonuridae	EPH	SIP	7	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I890	*Analetris*	EPH	SIP	7	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
I900	*Ameletus*	EPH	SIP	0	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I905	*Ameletus connectus*	EPH	SIP	0	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I907	*Ameletus cooki*	EPH	SIP	0	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I910	*Ameletus exquisitus*	EPH	SIP	0	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I912	*Ameletus oregonensis*	EPH	SIP	0	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I915	*Ameletus similior*	EPH	SIP	0	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I917	*Ameletus sparsatus*	EPH	SIP	0	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I920	*Ameletus suffusus*	EPH	SIP	0	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I922	*Ameletus validus*	EPH	SIP	0	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I925	*Ameletus velox*	EPH	SIP	0	48	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I930	*Parameletus*	EPH	SIP	7	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I935	*Parameletus columbiae*	EPH	SIP	7	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I940	*Siphlonurus*	EPH	SIP	7	72	0	0	0	0	0	0	0	0	0	100	0	0	100	0
I942	*Siphlonurus autumnalis*	EPH	SIP	7	72	0	0	0	0	0	0	0	0	0	100	0	0	100	0
I945	*Siphlonurus columbianus*	EPH	SIP	7	72	0	0	0	0	0	0	0	0	0	100	0	0	100	0
I950	*Siphlonurus occidentalis*	EPH	SIP	7	72	0	0	0	0	0	0	0	0	0	100	0	0	100	0
I960	Tricorythidae	EPH	TRY	4	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I970	*Leptohyphes*	EPH	TRY	4	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I980	*Tricorythodes*	EPH	TRY	4	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
I990	*Tricorythodes minutus*	EPH	TRY	4	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
J000	Plecoptera	PLE	PLE	11	110	0	0	0	0	0	0	0	0	0	0	100	0	100	0
J020	Capniidae	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J030	*Allocapnia*	PLE	CAP	3	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J100	*Bolshecapnia*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J102	*Bolshecapnia gregsoni*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J104	*Bolshecapnia maculata*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J106	*Bolshecapnia milami*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J108	*Bolshecapnia rogozera*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J110	*Bolshecapnia sasquatchi*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J112	*Bolshecapnia spenceri*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J120	*Capnia*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J122	*Capnia bakeri*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J124	*Capnia barbata*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J126	*Capnia barberi*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J128	*Capnia californica*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J130	*Capnia cheama*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J132	*Capnia coloradensis*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J134	*Capnia confusa*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J136	*Capnia cygna*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J138	*Capnia decepta*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J140	*Capnia disala*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J142	*Capnia elevata*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J144	*Capnia elongata*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J146	*Capnia ensicala*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J148	*Capnia erecta*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J150	*Capnia excavata*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J152	*Capnia fibula*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J154	*Capnia glabra*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J156	*Capnia gracilaria*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J158	*Capnia hornigi*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J160	*Capnia jewetti*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J162	*Capnia lacustra*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J164	*Capnia licina*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J166	*Capnia lineata*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J168	*Capnia manitoba*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J169	*Capnia melia*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J170	*Capnia nana*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J171	*Capnia nearctica*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J172	*Capnia nedia*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J174	*Capnia oregona*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J176	*Capnia petila*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J177	*Capnia pileata*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J178	*Capnia promota*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J180	*Capnia quadrituberosa*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J182	*Capnia scobina*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J183	*Capnia sextuberculata*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J184	*Capnia spinulosa*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J185	*Capnia sugluka*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J186	*Capnia teresa*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J187	*Capnia tumida*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J188	*Capnia uintahi*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J189	*Capnia umpqua*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J190	*Capnia utahensis*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J191	*Capnia venosa*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J192	*Capnia vernalis*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J193	*Capnia wanica*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J194	*Capnia willametta*	PLE	CAP	11	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J195	*Capnia zukeli*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J200	*Eucapnopsis brevicauda*	PLE	CAP	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J210	*Isocapnia*	PLE	CAP	1	24	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J211	*Isocapnia abbreviata*	PLE	CAP	1	24	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J212	*Isocapnia agassizi*	PLE	CAP	1	24	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J214	*Isocapnia crinita*	PLE	CAP	1	24	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J216	*Isocapnia fraseri*	PLE	CAP	1	24	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J218	*Isocapnia grandis*	PLE	CAP	1	24	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J219	*Isocapnia hyalita*	PLE	CAP	1	24	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J220	*Isocapnia integra*	PLE	CAP	1	24	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J222	*Isocapnia missourii*	PLE	CAP	1	24	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J223	*Isocapnia mogila*	PLE	CAP	1	24	0	0	0	0	0	0	0	100	0	0	0	0	100	0

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
J224	*Isocapnia spenceri*	PLE	CAP	1	24	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J226	*Isocapnia vedderensis*	PLE	CAP	1	24	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J230	*Mesocapnia*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J232	*Mesocapnia arizonensis*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J233	*Mesocapnia autumna*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J234	*Mesocapnia bergi*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J236	*Mesocapnia frisoni*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J238	*Mesocapnia lapwae*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J240	*Mesocapnia oenone*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J241	*Mesocapnia ogotoruka*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J242	*Mesocapnia porrecta*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J243	*Mesocapnia projecta*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J245	*Mesocapnia variabilis*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J246	*Mesocapnia werneri*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J247	*Mesocapnia yoloensis*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J250	*Nemocapnia*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J253	*Nemocapnia carolina*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J260	*Paracapnia*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J262	*Paracapnia angulata*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J264	*Paracapnia opis*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J266	*Paracapnia oswegaptera*	PLE	CAP	1	32	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J270	*Utacapnia*	PLE	CAP	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J272	*Utacapnia columbiana*	PLE	CAP	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J274	*Utacapnia distincta*	PLE	CAP	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J276	*Utacapnia imbera*	PLE	CAP	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J278	*Utacapnia laboradora*	PLE	CAP	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J280	*Utacapnia lemoniana*	PLE	CAP	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J282	*Utacapnia logana*	PLE	CAP	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J284	*Utacapnia poda*	PLE	CAP	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J286	*Utacapnia sierra*	PLE	CAP	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J288	*Utacapnia tahoensis*	PLE	CAP	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J290	*Utacapnia trava*	PLE	CAP	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J300	Chloroperlidae	PLE	CHL	1	24	50	0	25	0	0	0	25	0	0	0	0	0	100	0
J310	*Alloperla*	PLE	CHL	0	24	50	0	25	0	0	0	25	0	0	0	0	0	100	0
J380	*Bisancora*	PLE	CHL	0	24	50	0	25	0	0	0	25	0	0	0	0	0	100	0
J382	*Bisancora pastina*	PLE	CHL	0	24	50	0	25	0	0	0	25	0	0	0	0	0	100	0
J384	*Bisancora rutriformis*	PLE	CHL	0	24	50	0	25	0	0	0	25	0	0	0	0	0	100	0
J390	*Haploperla*	PLE	CHL	0	24	75	0	0	0	0	0	25	0	0	0	0	0	100	0
J392	*Haploperla brevis*	PLE	CHL	0	24	75	0	0	0	0	0	25	0	0	0	0	0	100	0
J393	*Haploperla chilnualna*	PLE	CHL	0	24	75	0	0	0	0	0	25	0	0	0	0	0	100	0
J394	*Haploperla chukcho*	PLE	CHL	0	24	75	0	0	0	0	0	25	0	0	0	0	0	100	0
J396	*Haploperla orpha*	PLE	CHL	0	24	75	0	0	0	0	0	25	0	0	0	0	0	100	0
J400	*Kathroperla*	PLE	CHL	0	24	50	0	25	0	0	0	25	0	0	0	0	0	100	0
J402	*Kathroperla perdita*	PLE	CHL	0	24	50	0	25	0	0	0	25	0	0	0	0	0	100	0
J404	*Kathroperla takhoma*	PLE	CHL	0	24	50	0	25	0	0	0	25	0	0	0	0	0	100	0
J410	*Neaviperla*	PLE	CHL	0	24	50	0	25	0	0	0	25	0	0	0	0	0	100	0
J412	*Neaviperla forcipata*	PLE	CHL	0	24	50	0	25	0	0	0	25	0	0	0	0	0	100	0
J420	*Paraperla*	PLE	CHL	0	24	50	0	25	0	0	0	25	0	0	0	0	0	100	0
J422	*Paraperla frontalis*	PLE	CHL	0	24	50	0	25	0	0	0	25	0	0	0	0	0	100	0
J424	*Paraperla wilsoni*	PLE	CHL	0	24	50	0	25	0	0	0	25	0	0	0	0	0	100	0
J430	*Plumiperla*	PLE	CHL	0	24	50	0	25	0	0	0	25	0	0	0	0	0	100	0
J432	*Plumiperla diversa*	PLE	CHL	0	24	50	0	25	0	0	0	25	0	0	0	0	0	100	0
J434	*Plumiperla spinosa*	PLE	CHL	0	24	50	0	25	0	0	0	25	0	0	0	0	0	100	0
J440	*Rasvena*	PLE	CHL	0	24	50	0	25	0	0	0	25	0	0	0	0	0	100	0
J442	*Rasvena terna*	PLE	CHL	0	24	50	0	25	0	0	0	25	0	0	0	0	0	100	0
J450	*Suwallia*	PLE	CHL	0	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J452	*Suwallia autumna*	PLE	CHL	0	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J454	*Suwallia dubia*	PLE	CHL	0	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J456	*Suwallia lineosa*	PLE	CHL	0	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J458	*Suwallia marginata*	PLE	CHL	0	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J460	*Suwallia pallidula*	PLE	CHL	0	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J470	*Sweltsa*	PLE	CHL	1	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J472	*Sweltsa albertensis*	PLE	CHL	1	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J474	*Sweltsa borealis*	PLE	CHL	1	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J476	*Sweltsa californica*	PLE	CHL	1	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J478	*Sweltsa coloradensis*	PLE	CHL	1	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J480	*Sweltsa continua*	PLE	CHL	1	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J482	*Sweltsa exquisita*	PLE	CHL	1	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J484	*Sweltsa fidelis*	PLE	CHL	1	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
J486	*Sweltsa gaufini*	PLE	CHL	1	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J488	*Sweltsa hondo*	PLE	CHL	1	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J490	*Sweltsa lamba*	PLE	CHL	1	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J492	*Sweltsa lateralis*	PLE	CHL	1	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J494	*Sweltsa mediana*	PLE	CHL	1	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J496	*Sweltsa naica*	PLE	CHL	1	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J498	*Sweltsa occidens*	PLE	CHL	1	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J500	*Sweltsa onkos*	PLE	CHL	1	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J502	*Sweltsa oregonensis*	PLE	CHL	1	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J504	*Sweltsa pacifica*	PLE	CHL	1	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J506	*Sweltsa revelstoka*	PLE	CHL	1	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J508	*Sweltsa tamalpa*	PLE	CHL	1	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J510	*Sweltsa townesi*	PLE	CHL	1	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J512	*Sweltsa urticae*	PLE	CHL	1	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J514	*Sweltsa Complex*	PLE	CHL	1	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J520	*Triznaka*	PLE	CHL	0	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J522	*Triznaka pintada*	PLE	CHL	0	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J524	*Triznaka signata*	PLE	CHL	0	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
J530	*Utaperla*	PLE	CHL	0	24	50	0	25	0	0	0	25	0	0	0	0	0	100	0
J532	*Utaperla gaspesiana*	PLE	CHL	0	24	50	0	25	0	0	0	25	0	0	0	0	0	100	0
J534	*Utaperla sopladora*	PLE	CHL	0	24	50	0	25	0	0	0	25	0	0	0	0	0	100	0
J550	Leuctridae	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J560	*Despaxia*	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J562	*Despaxia augusta*	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J570	*Leuctra*	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J610	*Megaleuctra*	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J612	*Megaleuctra comlicata*	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J614	*Megaleuctra flinti*	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J616	*Megaleuctra sierra*	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J618	*Megaleuctra stigmata*	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J620	*Megaleuctra williamsae*	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J630	*Moselia*	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J632	*Moselia infuscata*	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J640	*Paraleuctra*	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J643	*Paraleuctra andersoni*	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J646	*Paraleuctra divisa*	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J649	*Paraleuctra forcipata*	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J652	*Paraleuctra jewetti*	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J655	*Paraleuctra occidentalis*	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J658	*Paraleuctra purcellana*	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J661	*Paraleuctra rickeri*	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J664	*Paraleuctra sara*	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J667	*Paraleuctra vershina*	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J680	*Perlomyia*	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J683	*Perlomyia collaris*	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J686	*Perlomyia utahensis*	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J690	*Zealeuctra*	PLE	LEU	0	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J700	Nemouridae	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J720	*Amphinemura*	PLE	NEM	2	6	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J750	*Lednia*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J755	*Lednia tumana*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J780	*Malenka*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J783	*Malenka bifurcata*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J786	*Malenka biloba*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J788	*Malenka californica*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J790	*Malenka coloradensis*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J792	*Malenka cornuta*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J794	*Malenka depressa*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J796	*Malenka flexura*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J798	*Malenka marionae*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J800	*Malenka perplexa*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J802	*Malenka tina*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J804	*Malenka wenatchee*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J810	*Nemoura*	PLE	NEM	1	24	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J813	*Nemoura arctica*	PLE	NEM	1	24	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J816	*Nemoura normani*	PLE	NEM	1	24	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J819	*Nemoura rickeri*	PLE	NEM	1	24	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J822	*Nemoura spiniloba*	PLE	NEM	1	24	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J825	*Nemoura trispinosa*	PLE	NEM	1	24	0	0	0	0	0	0	0	100	0	0	0	0	100	0

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
J830	*Ostrocerca*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J832	*Ostracerca albidipennis*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J834	*Ostracerca complexa*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J836	*Ostracerca dimicki*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J838	*Ostracerca foersteri*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J840	*Ostracerca prolongata*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J842	*Ostracerca truncata*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J850	*Paranemoura*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J855	*Paranemoura perfecta*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J870	*Podmosta*	PLE	NEM	2	12	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J872	*Podmosta decepta*	PLE	NEM	2	12	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J874	*Podmosta delicatula*	PLE	NEM	2	12	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J876	*Podmosta macdunnoughi*	PLE	NEM	2	12	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J878	*Podmosta obscura*	PLE	NEM	2	12	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J880	*Podmosta weberi*	PLE	NEM	2	12	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J890	*Prostoia*	PLE	NEM	2	24	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J893	*Prostoia besametsa*	PLE	NEM	2	24	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J896	*Prostoia completa*	PLE	NEM	1	24	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J899	*Prostoia hallasi*	PLE	NEM	2	24	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J902	*Prostoia similis*	PLE	NEM	2	24	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J910	*Shipsa*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J915	*Shipsa rotunda*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J920	*Soyedina*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J922	*Soyedina carolinensis*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J924	*Soyedina interrupta*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J926	*Soyedina nevadensis*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J928	*Soyedina potteri*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J930	*Soyedina producta*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J932	*Soyedina vallicularia*	PLE	NEM	0	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J934	*Soyedina washingtoni*	PLE	NEM	2	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J940	*Visoka*	PLE	NEM	0	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J945	*Visoka cataractae*	PLE	NEM	0	36	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J950	*Zapada*	PLE	NEM	2	16	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J953	*Zapada chila*	PLE	NEM	2	16	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J956	*Zapada cinctipes*	PLE	NEM	2	16	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J959	*Zapada columbiana*	PLE	NEM	2	16	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J962	*Zapada cordillera*	PLE	NEM	2	16	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J965	*Zapada frigida*	PLE	NEM	2	16	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J968	*Zapada glacier*	PLE	NEM	2	16	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J971	*Zapada haysi*	PLE	NEM	2	16	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J974	*Zapada oregonensis*	PLE	NEM	2	16	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J977	*Zapada Oregonensis Gr.*	PLE	NEM	2	16	0	0	0	0	0	0	0	100	0	0	0	0	100	0
J980	*Zapada wahkeena*	PLE	NEM	2	16	0	0	0	0	0	0	0	100	0	0	0	0	100	0
K000	Perlidae	PLE	PER	1	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K020	*Acroneuria*	PLE	PER	0	6	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K040	*Agnetina*	PLE	PER	2	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K043	*Agnetina annulipes*	PLE	PER	2	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K046	*Agnetina capitata*	PLE	PER	2	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K049	*Agnetina flavescens*	PLE	PER	2	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K060	*Anacroneuria*	PLE	PER	1	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K065	*Anacroneuria comanche*	PLE	PER	1	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K070	*Anacroneuria wipukupa*	PLE	PER	1	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K080	*Attaneuria*	PLE	PER	1	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K085	*Attaneuria ruralis*	PLE	PER	1	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K100	*Beloneuria*	PLE	PER	1	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K102	*Beloneuria georgiana*	PLE	PER	1	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K104	*Beloneuria jamesae*	PLE	PER	1	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K106	*Beloneuria stewarti*	PLE	PER	1	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K110	*Calineuria*	PLE	PER	2	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K113	*Calineuria californica*	PLE	PER	2	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K120	*Claassenia*	PLE	PER	3	6	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K125	*Claassenia sabulosa*	PLE	PER	3	6	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K130	*Doroneuria*	PLE	PER	1	18	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K135	*Doroneuria baumanni*	PLE	PER	1	18	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K140	*Doroneuria theodora*	PLE	PER	1	18	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K150	*Eccoptura*	PLE	PER	1	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K155	*Eccoptura xanthenes*	PLE	PER	1	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
K170	*Hansonoperla*	PLE	PER	1	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K175	*Hansonoperla appalachia*	PLE	PER	1	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K190	*Hesperoperla*	PLE	PER	2	18	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K195	*Hesperoperla hoguei*	PLE	PER	2	18	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K200	*Hesperoperla pacifica*	PLE	PER	2	18	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K210	*Neoperla*	PLE	PER	1	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K215	*Neoperla clymene*	PLE	PER	3	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K230	*Paragnetina*	PLE	PER	1	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K250	*Perlesta*	PLE	PER	5	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K255	*Perlesta frisoni*	PLE	PER	5	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K260	*Perlesta placida*	PLE	PER	5	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K270	*Perlinella*	PLE	PER	1	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
K300	Perlodidae	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K310	*Arcynopteryx*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K313	*Arcynopteryx compacta*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K320	*Baumannella*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K323	*Baumannella alameda*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K330	*Calliperla*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K333	*Calliperla luctuosa*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K340	*Cascadoperla*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K343	*Cascadoperla trictura*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K350	*Chernokrilus*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K352	*Chernokrilus erratus*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K354	*Chernokrilus misnomus*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K356	*Chernokrilus venustus*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K360	*Clioperla*	PLE	PED	1	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K365	*Clioperla clio*	PLE	PED	1	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K370	*Cosumnoperla*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K375	*Cosumnoperla hypocrena*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K378	*Cultus*	PLE	PED	2	12	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K380	*Cultus aestivalis*	PLE	PED	2	12	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K382	*Cultus decisus*	PLE	PED	2	12	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K384	*Cultus pilatus*	PLE	PED	2	12	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K386	*Cultus tostonus*	PLE	PED	2	12	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K390	*Diploperla*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K400	*Diura*	PLE	PED	2	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K402	*Diura bicaudata*	PLE	PED	2	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K404	*Diura knowltoni*	PLE	PED	2	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K406	*Diura nanseni*	PLE	PED	2	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K410	*Frisonia*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K415	*Frisonia picticeps*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K420	*Helopicus*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K430	*Hydroperla*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K440	*Isogenoides*	PLE	PED	2	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K450	*Isoperla*	PLE	PED	2	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K520	*Kogotus*	PLE	PED	2	18	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K525	*Kogotus modestus*	PLE	PED	2	18	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K527	*Kogotus nonus*	PLE	PED	2	18	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K540	*Malirekus*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K545	*Malirekus hastatus*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K548	*Malirekus iroquois*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K550	*Megarcys*	PLE	PED	2	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K555	*Megarcys irregularis*	PLE	PED	2	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K560	*Megarcys signata*	PLE	PED	2	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K565	*Meagarcys subtruncata*	PLE	PED	2	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K570	*Megarcys watertoni*	PLE	PED	2	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K575	*Magarcys yosemite*	PLE	PED	2	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K580	*Oconoperla*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K585	*Oconoperla innubila*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K590	*Oroperla*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K595	*Oroperla barbara*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K600	*Osobenus*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K605	*Osobenus yakimae*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K610	*Perlinodes*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K615	*Perlinodes aureus*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K620	*Pictetiella*	PLE	PED	2	18	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K625	*Pictetiella expansa*	PLE	PED	2	18	100	0	0	0	0	0	0	0	0	0	0	0	100	0

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
K630	*Remenus*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K635	*Remenus bilobatus*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K640	*Rickera*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K645	*Rickera sorpta*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K650	*Salmoperla*	PLE	PED	0	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K655	*Salmoperla sylvanica*	PLE	PED	0	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K660	*Setvena*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K663	*Setvena bradleyi*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K665	*Setvena tibialis*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K667	*Setvena wahkeena*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K670	*Skwala*	PLE	PED	2	18	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K673	*Skwala curvata*	PLE	PED	2	18	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K677	*Skwala parallela*	PLE	PED	2	18	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K680	*Yugus*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K683	*Yugus arinus*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K687	*Yugus bulbosus*	PLE	PED	2	48	100	0	0	0	0	0	0	0	0	0	0	0	100	0
K700	Peltoperlidae	PLE	PLT	1	12	0	0	0	0	0	0	0	100	0	0	0	0	100	0
K730	*Peltoperla*	PLE	PLT	1	12	0	0	0	0	0	0	0	100	0	0	0	0	100	0
K735	*Peltoperla arcuata*	PLE	PLT	1	12	0	0	0	0	0	0	0	100	0	0	0	0	100	0
K737	*Peltoperla tarteri*	PLE	PLT	1	12	0	0	0	0	0	0	0	100	0	0	0	0	100	0
K740	*Sierraperla*	PLE	PLT	1	12	0	0	0	0	0	0	0	100	0	0	0	0	0	100
K745	*Sierraperla cora*	PLE	PLT	1	12	0	0	0	0	0	0	0	100	0	0	0	0	0	100
K750	*Soliperla*	PLE	PLT	1	12	0	0	0	0	0	0	0	100	0	0	0	0	0	100
K752	*Soliperla campanula*	PLE	PLT	1	12	0	0	0	0	0	0	0	100	0	0	0	0	0	100
K754	*Soliperla fenderi*	PLE	PLT	1	12	0	0	0	0	0	0	0	100	0	0	0	0	0	100
K756	*Soliperla quadrispinula*	PLE	PLT	1	12	0	0	0	0	0	0	0	100	0	0	0	0	0	100
K758	*Soliperla sierra*	PLE	PLT	1	12	0	0	0	0	0	0	0	100	0	0	0	0	0	100
K760	*Soliperla thyra*	PLE	PLT	1	12	0	0	0	0	0	0	0	100	0	0	0	0	0	100
K762	*Soliperla tillamook*	PLE	PLT	1	12	0	0	0	0	0	0	0	100	0	0	0	0	0	100
K770	*Tallaperla*	PLE	PLT	1	12	0	0	0	0	0	0	0	100	0	0	0	0	100	0
K780	*Viehoperla*	PLE	PLT	1	12	0	0	0	0	0	0	0	100	0	0	0	0	100	0
K782	*Viehoperla ada*	PLE	PLT	1	12	0	0	0	0	0	0	0	100	0	0	0	0	100	0
K785	*Yoraperla*	PLE	PLT	1	12	0	0	0	0	0	0	0	100	0	0	0	0	100	0
K787	*Yoraperla brevis*	PLE	PLT	1	12	0	0	0	0	0	0	0	100	0	0	0	0	100	0
K790	*Yoraperla mariana*	PLE	PLT	1	12	0	0	0	0	0	0	0	100	0	0	0	0	100	0
K800	Pteronarcidae	PLE	PTE	0	24	25	0	0	0	0	0	25	50	0	0	0	0	0	100
K810	*Pteronarcella*	PLE	PTE	0	24	25	0	0	0	0	0	25	50	0	0	0	0	0	100
K815	*Pteronarcella badia*	PLE	PTE	0	24	25	0	0	0	0	0	25	50	0	0	0	0	0	100
K820	*Pteronarcella regularis*	PLE	PTE	0	24	25	0	0	0	0	0	25	50	0	0	0	0	0	100
K825	*Pteronarcys*	PLE	PTE	0	24	25	0	0	0	0	0	25	50	0	0	0	0	0	100
K830	*Pteronarcys biloba*	PLE	PTE	0	24	25	0	0	0	0	0	25	50	0	0	0	0	0	100
K835	*Pteronarcys californica*	PLE	PTE	1	18	25	0	0	0	0	0	25	50	0	0	0	0	0	100
K840	*Pteronarcys comstocki*	PLE	PTE	0	24	25	0	0	0	0	0	25	50	0	0	0	0	0	100
K845	*Pteronarcys dorsata*	PLE	PTE	0	24	25	0	0	0	0	0	25	50	0	0	0	0	0	100
K850	*Pteronarcys pictetii*	PLE	PTE	0	24	25	0	0	0	0	0	25	50	0	0	0	0	0	100
K855	*Pteronarcys princeps*	PLE	PTE	0	24	25	0	0	0	0	0	25	50	0	0	0	0	0	100
K860	*Pteronarcys proteus*	PLE	PTE	0	24	25	0	0	0	0	0	25	50	0	0	0	0	0	100
K865	*Pteronarcys scotti*	PLE	PTE	0	24	25	0	0	0	0	0	25	50	0	0	0	0	0	100
K900	Taeniopterygidae	PLE	TAE	2	48	0	0	25	0	0	0	25	50	0	0	0	0	100	0
K910	*Bolotoperla*	PLE	TAE	2	48	0	0	25	0	0	0	25	50	0	0	0	0	100	0
K915	*Bolotoperla rossi*	PLE	TAE	2	48	0	0	25	0	0	0	25	50	0	0	0	0	100	0
K920	*Doddsia*	PLE	TAE	2	24	0	0	25	0	0	0	25	50	0	0	0	0	100	0
K925	*Doddsia occidentalis*	PLE	TAE	2	24	0	0	25	0	0	0	25	50	0	0	0	0	100	0
K930	*Oemopteryx*	PLE	TAE	1	48	0	0	25	0	0	0	25	50	0	0	0	0	100	0
K932	*Oemopteryx contorta*	PLE	TAE	1	48	0	0	25	0	0	0	25	50	0	0	0	0	100	0
K934	*Oemopteryx fosketti*	PLE	TAE	1	48	0	0	25	0	0	0	25	50	0	0	0	0	100	0
K936	*Oemopteryx glacialis*	PLE	TAE	1	48	0	0	25	0	0	0	25	50	0	0	0	0	100	0
K940	*Strophopteryx*	PLE	TAE	2	48	0	0	25	0	0	0	25	50	0	0	0	0	100	0
K950	*Taenionema*	PLE	TAE	2	48	0	0	25	0	0	0	25	50	0	0	0	0	100	0
K952	*Taenionema atlanticum*	PLE	TAE	2	48	0	0	25	0	0	0	25	50	0	0	0	0	100	0
K954	*Taenionema californicum*	PLE	TAE	2	48	0	0	25	0	0	0	25	50	0	0	0	0	100	0
K956	*Taenionema grinnelli*	PLE	TAE	2	48	0	0	25	0	0	0	25	50	0	0	0	0	100	0
K958	*Taenionema nigripenne*	PLE	TAE	2	48	0	0	25	0	0	0	25	50	0	0	0	0	100	0
K960	*Taenionema oregonense*	PLE	TAE	2	48	0	0	25	0	0	0	25	50	0	0	0	0	100	0
K962	*Taenionema pacificum*	PLE	TAE	2	48	0	0	25	0	0	0	25	50	0	0	0	0	100	0
K964	*Taenionema pallidum*	PLE	TAE	2	48	0	0	25	0	0	0	25	50	0	0	0	0	100	0
K966	*Taenionema raynorium*	PLE	TAE	2	48	0	0	25	0	0	0	25	50	0	0	0	0	100	0
K970	*Taeniopteryx*	PLE	TAE	2	48	0	0	25	0	0	0	25	50	0	0	0	0	100	0

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
L000	Hemiptera	HEM	HEM	8	72	0	0	0	0	0	0	0	0	0	0	100	0	100	0
L050	Belostomatidae	HEM	BEL	8	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
L070	*Belostoma*	HEM	BEL	8	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
L080	*Lethocerus*	HEM	BEL	8	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
L100	Corixidae	HEM	COR	8	108	50	0	0	0	0	50	0	0	0	0	0	0	100	0
L105	Corixidae-unid. nymphs	HEM	COR	8	108	50	0	0	0	0	50	0	0	0	0	0	0	100	0
L120	*Callicorixa*	HEM	COR	8	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L130	*Cenocorixa*	HEM	COR	8	108	50	0	0	0	0	50	0	0	0	0	0	0	100	0
L140	*Corisella*	HEM	COR	8	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L150	*Graptocorixa*	HEM	COR	8	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L160	*Hesperocorixa*	HEM	COR	8	108	0	0	0	0	0	100	0	0	0	0	0	0	100	0
L200	*Palmacorixa*	HEM	COR	8	108	50	0	0	0	0	50	0	0	0	0	0	0	100	0
L205	*Palmocorixa buenoi*	HEM	COR	8	108	50	0	0	0	0	50	0	0	0	0	0	0	100	0
L215	*Palmocorixa gillettei*	HEM	COR	8	108	50	0	0	0	0	50	0	0	0	0	0	0	100	0
L220	*Sigara*	HEM	COR	8	108	0	0	50	0	0	50	0	0	0	0	0	0	100	0
L230	*Trichocorixa*	HEM	COR	8	108	75	0	25	0	0	0	0	0	0	0	0	0	100	0
L235	*Trichocorixa borealis*	HEM	COR	8	108	75	0	25	0	0	0	0	0	0	0	0	0	100	0
L240	*Trichocorixa naias*	HEM	COR	8	108	75	0	25	0	0	0	0	0	0	0	0	0	100	0
L245	*Trichocorixa verticalis interiores*	HEM	COR	8	108	75	0	25	0	0	0	0	0	0	0	0	0	100	0
L300	Gelastocoridae	HEM	GEL	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L310	*Gelastocoris*	HEM	GEL	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L350	Gerridae	HEM	GER	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L360	*Gerris*	HEM	GER	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L365	*Gerris buenoi*	HEM	GER	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L370	*Gerris remigis*	HEM	GER	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L390	*Limnoporus*	HEM	GER	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L400	*Metrobates*	HEM	GER	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L420	*Trepobates*	HEM	GER	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L450	Hebridae	HEM	HEB	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L460	*Hebrus*	HEM	HEB	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L480	*Merragata*	HEM	HEB	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L500	Hydrometridae	HEM	HME	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L520	*Hydrometra*	HEM	HME	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L550	Mesoveliidae	HEM	MES	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L560	*Mesovelia*	HEM	MES	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L580	Naucoridae	HEM	NAU	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L585	*Ambrysus*	HEM	NAU	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L600	Nepidae	HEM	NEP	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L620	*Ranatra*	HEM	NEP	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L650	Notonectidae	HEM	NOT	11	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L660	*Buenoa*	HEM	NOT	11	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L680	*Notonecta*	HEM	NOT	11	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L700	Pleidae	HEM	PLI	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L720	*Paraplea*	HEM	PLI	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L750	Saldidae	HEM	SAL	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L800	Veliidae	HEM	VEL	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L830	*Microvelia*	HEM	VEL	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
L850	*Rhagovelia*	HEM	VEL	11	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
M000	Megaloptera	MEG	MEG	11		100	0	0	0	0	0	0	0	0	0	0	0	0	100
M050	Corydalidae	MEG	COY	0	110	100	0	0	0	0	0	0	0	0	0	0	0	0	100
M100	*Chauliodes*	MEG	COY	4	110	100	0	0	0	0	0	0	0	0	0	0	0	0	100
M150	*Corydalus*	MEG	COY	6	110	100	0	0	0	0	0	0	0	0	0	0	0	0	100
M200	*Dymiscohermes*	MEG	COY	0	110	100	0	0	0	0	0	0	0	0	0	0	0	0	100
M250	*Neohermes*	MEG	COY	0	110	100	0	0	0	0	0	0	0	0	0	0	0	0	100
M300	*Nigronia*	MEG	COY	0	110	100	0	0	0	0	0	0	0	0	0	0	0	0	100
M350	*Orohermes*	MEG	COY	0	110	100	0	0	0	0	0	0	0	0	0	0	0	0	100
M400	*Protochauliodes*	MEG	COY	0	110	100	0	0	0	0	0	0	0	0	0	0	0	0	100
M500	Sialidae	MEG	SIA	4	110	100	0	0	0	0	0	0	0	0	0	0	0	100	0
M550	*Sialis*	MEG	SIA	4	110	100	0	0	0	0	0	0	0	0	0	0	0	100	0
M570	*Sialis californica*	MEG	SIA	4	110	100	0	0	0	0	0	0	0	0	0	0	0	100	0
M590	*Sialis rotunda*	MEG	SIA	4	110	100	0	0	0	0	0	0	0	0	0	0	0	100	0
M600	Sisyridae	MEG	SIS	11	110	100	0	0	0	0	0	0	0	0	0	0	0	100	0
M630	*Climacia*	MEG	SIS	11	110	100	0	0	0	0	0	0	0	0	0	0	0	100	0

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
N000	Trichoptera	TRI	TRI	11	110	0	0	0	0	0	0	0	0	0	0	100	0	100	0
N020	Arctopsychidae	TRI	ARC	2	110	75	0	0	25	0	0	0	0	0	0	0	0	0	100
N050	*Arctopsyche grandis*	TRI	ARC	1	18	75	0	0	25	0	0	0	0	0	0	0	0	0	100
N055	*Arctopsyche irrorata*	TRI	ARC	1	18	75	0	0	25	0	0	0	0	0	0	0	0	0	100
N060	*Arctopsyche ladogensis*	TRI	ARC	1	18	75	0	0	25	0	0	0	0	0	0	0	0	0	100
N080	Parapsyche	TRI	ARC	0	6	75	0	0	25	0	0	0	0	0	0	0	0	0	100
N083	*Parapsyche almota*	TRI	ARC	2	6	75	0	0	25	0	0	0	0	0	0	0	0	0	100
N086	*Parapsyche apicalis*	TRI	ARC	0	6	75	0	0	25	0	0	0	0	0	0	0	0	0	100
N089	*Parapsyche elsis*	TRI	ARC	1	6	75	0	0	25	0	0	0	0	0	0	0	0	0	100
N092	*Parapsyche spinata*	TRI	ARC	0	6	75	0	0	25	0	0	0	0	0	0	0	0	0	100
N095	*Parapsyche turbinata*	TRI	ARC	0	6	75	0	0	25	0	0	0	0	0	0	0	0	0	100
N100	Brachycentridae	TRI	BRC	1	24	0	0	0	0	0	0	0	0	0	0	100	0	100	0
N110	*Adicrophleps*	TRI	BRC	2	24	0	0	0	0	100	0	0	0	0	0	0	0	100	0
N130	*Amiocentrus aspilus*	TRI	BRC	3	24	0	0	100	0	0	0	0	0	0	0	0	0	100	0
N150	*Brachycentrus*	TRI	BRC	1	24	0	0	0	50	0	0	50	0	0	0	0	0	0	100
N160	*Brachycentrus americanus*	TRI	BRC	1	24	0	0	0	50	0	0	50	0	0	0	0	0	0	100
N170	*Brachycentrus occidentalis*	TRI	BRC	1	24	0	0	0	50	0	0	50	0	0	0	0	0	0	100
N200	*Eobrachycentrus gelidae*	TRI	BRC	0	24	0	0	0	0	100	0	0	0	0	0	0	0	0	100
N210	*Micrasema*	TRI	BRC	1	24	0	0	0	0	100	0	0	0	0	0	0	0	100	0
N215	*Micrasema bactro*	TRI	BRC	1	24	0	0	0	0	100	0	0	0	0	0	0	0	100	0
N220	*Micrasema dimicki*	TRI	BRC	2	24	0	0	0	0	100	0	0	0	0	0	0	0	100	0
N225	*Micrasema diterus*	TRI	BRC	1	24	0	0	0	0	100	0	0	0	0	0	0	0	100	0
N230	*Micrasema onisca*	TRI	BRC	1	24	0	0	0	0	100	0	0	0	0	0	0	0	100	0
N250	*Oligoplectrum echo*	TRI	BRC	2	24	0	0	0	50	0	0	50	0	0	0	0	0	100	0
N270	Calamoceratidae	TRI	CAM	1	110	0	0	0	0	0	0	0	50	50	0	0	0	0	100
N280	*Heteroplectron californicum*	TRI	CAM	1	110	0	0	0	0	0	0	0	50	50	0	0	0	0	100
N290	*Phylloicus*	TRI	CAM	1	110	0	0	0	0	0	0	0	100	0	0	0	0	0	100
N300	Glossosomatidae	TRI	GLO	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N320	*Agapetus*	TRI	GLO	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N325	*Agapetus arcita*	TRI	GLO	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N330	*Agapetus bifidus*	TRI	GLO	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N335	*Agapetus boulderensis*	TRI	GLO	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N340	*Agapetus celatus*	TRI	GLO	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N342	*Agapetus cornuta*	TRI	GLO	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N345	*Agapetus denningi*	TRI	GLO	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N350	*Agapetus joannia*	TRI	GLO	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N353	*Agapetus malleatus*	TRI	GLO	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
M355	*Agapetus marlo*	TRI	GLO	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N357	*Agapetus montanus*	TRI	GLO	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N360	*Agapetus occidentis*	TRI	GLO	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N362	*Agapetus ophionis*	TRI	GLO	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N365	*Agapetus orosus*	TRI	GLO	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N370	*Agapetus taho*	TRI	GLO	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N375	*Anagapetus*	TRI	GLO	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N377	*Anagapetus aisha*	TRI	GLO	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N380	*Anagapetus bernea*	TRI	GLO	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N382	*Anagapetus chandleri*	TRI	GLO	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N385	*Anagapetus debilis*	TRI	GLO	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N387	*Anagapetus hoodi*	TRI	GLO	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N390	*Anagapetus thirza*	TRI	GLO	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N400	*Culoptila*	TRI	GLO	2	32	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N405	*Culoptila cantha*	TRI	GLO	2	32	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N410	*Culoptila kimminsi*	TRI	GLO	2	32	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N415	*Culoptila moselyi*	TRI	GLO	2	32	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N420	*Culoptila thoracica*	TRI	GLO	2	32	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N450	*Glossosoma*	TRI	GLO	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N452	*Glossosoma alascense*	TRI	GLO	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N454	*Glossosoma bruna*	TRI	GLO	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N456	*Glossosoma califica*	TRI	GLO	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N458	*Glossosoma excitum*	TRI	GLO	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N460	*Glossosoma idaho*	TRI	GLO	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N462	*Glossosoma intermedium*	TRI	GLO	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N464	*Glossosoma lividum*	TRI	GLO	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N466	*Glossosoma mereca*	TRI	GLO	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N468	*Glossosoma montana*	TRI	GLO	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N470	*Glossosoma nigrior*	TRI	GLO	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N472	*Glossosoma oregonense*	TRI	GLO	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N474	*Glossosoma parvulum*	TRI	GLO	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N476	*Glossosoma penitum*	TRI	GLO	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
N478	*Glossosoma pterna*	TRI	GLO	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N480	*Glossosoma pyroxum*	TRI	GLO	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N482	*Glossosoma schuhi*	TRI	GLO	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N484	*Glossosoma traviatum*	TRI	GLO	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N486	*Glossosoma velona*	TRI	GLO	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N488	*Glossosoma ventrale*	TRI	GLO	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N490	*Glossosoma verdona*	TRI	GLO	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N492	*Glossosoma wenatchee*	TRI	GLO	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N500	*Protoptila*	TRI	GLO	1	32	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N505	*Protoptila coloma*	TRI	GLO	1	32	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N510	*Protoptila erotica*	TRI	GLO	1	32	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N515	*Protoptila tenebrosa*	TRI	GLO	1	32	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N530	Goeridae	TRI	GOE	1	110	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N535	*Goera archaon*	TRI	GOE	1	110	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N545	*Goeracea*	TRI	GOE	0	110	0	0	0	0	0	0	100	0	0	0	0	0	0	100
N547	*Goeracea genota*	TRI	GOE	0	110	0	0	0	0	0	0	100	0	0	0	0	0	0	100
N550	*Goeracea oregona*	TRI	GOE	0	110	0	0	0	0	0	0	100	0	0	0	0	0	0	100
N553	*Goereilla baumanni*	TRI	GOE	0	110	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N556	*Lepania cascada*	TRI	GOE	0	110	0	0	0	0	0	0	25	75	0	0	0	0	0	100
N560	Helicopsychidae	TRI	HEL	3	18	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N570	*Helicopsyche*	TRI	HEL	3	18	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N575	*Helicopsyche borealis*	TRI	HEL	3	18	0	0	0	0	0	0	100	0	0	0	0	0	100	0
N650	Hydropsychidae	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N670	*Aphropsyche*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N690	*Cheumatopsyche*	TRI	HYD	5	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N695	*Cheumatopsyche campyla*	TRI	HYD	5	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N700	*Cheumatopsyche enonis*	TRI	HYD	5	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N705	*Cheumatopsyche mickeli*	TRI	HYD	5	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N710	*Cheumatopsyche mollala*	TRI	HYD	5	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N715	*Cheumatopsyche pasella*	TRI	HYD	5	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N720	*Cheumatopsyche pettiti*	TRI	HYD	5	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N725	*Cheumatopsyche wabasha*	TRI	HYD	5	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N750	*Diplectrona*	TRI	HYD	0	48	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N760	*Diplectrona margarita*	TRI	HYD	0	48	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N765	*Diplectrona modesta*	TRI	HYD	0	48	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N780	*Homoplectra*	TRI	HYD	0	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N800	*Hydropsyche*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N802	*Hydropsyche abella*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N804	*Hydropsyche alhedra*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N806	*Hydropsyche alternans*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N808	*Hydropsyche amblis*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N810	*Hydropsyche andersoni*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N812	*Hydropsyche bicornuta*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N814	*Hydropsyche bidens*	TRI	HYD	3	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N816	*Hydropsyche bifidus*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N818	*Hydropsyche bronta*	TRI	HYD	6	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N820	*Hydropsyche brunneipennis*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N822	*Hydropsyche californica*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N824	*Hydropsyche centra*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N826	*Hydropsyche cockerelli*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N828	*Hydropsyche confusa*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N830	*Hydropsyche cora*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N832	*Hydropsyche dorata*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N834	*Hydropsyche intrica*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N836	*Hydropsyche jewetti*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N838	*Hydropsyche morosa*	TRI	HYD	6	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N840	*Hydropsyche occidentalis*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N842	*Hydropsyche oslari*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N844	*Hydropsyche philo*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N846	*Hydropsyche protis*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N848	*Hydropsyche recurvata*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N850	*Hydropsyche riola*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N852	*Hydropsyche separata*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N854	*Hydropsyche slossonae*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N856	*Hydropsyche tana*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N858	*Hydropsyche vanaca*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N860	*Hydropsyche venada*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N862	*Hydropsyche vexa*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N864	*Hydropsyche winema*	TRI	HYD	4	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
N900	*Macronema*	TRI	HYD	3	48	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N905	*Macronema carolina*	TRI	HYD	3	48	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N910	*Macronema transversum*	TRI	HYD	3	48	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N915	*Macronema zebratum*	TRI	HYD	3	48	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N925	*Potamyia*	TRI	HYD	5	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N930	*Potamyia flava*	TRI	HYD	5	108	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N950	*Smicridea*	TRI	HYD	4	72	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N960	*Smicridia dispar*	TRI	HYD	4	72	0	0	0	100	0	0	0	0	0	0	0	25	75	0
N970	*Smicridia fasiatella*	TRI	HYD	4	72	0	0	0	100	0	0	0	0	0	0	0	25	75	0
O000	Hydroptilidae	TRI	HOP	4	108	0	0	25	0	0	50	25	0	0	0	0	75	25	0
O020	*Agraylea*	TRI	HOP	8	108	0	0	25	0	0	75	0	0	0	0	0	75	25	0
O025	*Agraylea costello*	TRI	HOP	8	108	0	0	25	0	0	75	0	0	0	0	0	75	25	0
O030	*Agraylea multipunctata*	TRI	HOP	8	108	0	0	25	0	0	75	0	0	0	0	0	75	25	0
O035	*Agraylea saltesea*	TRI	HOP	8	108	0	0	25	0	0	75	0	0	0	0	0	75	25	0
O040	*Alisotrichia*	TRI	HOP	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
O060	*Dibusa angata*	TRI	HOP	4	108	0	0	0	0	0	0	100	0	0	0	0	75	25	0
O070	*Hydroptila*	TRI	HOP	6	108	0	0	0	0	0	75	25	0	0	0	0	75	25	0
O072	*Hydroptila ajax*	TRI	HOP	6	108	0	0	0	0	0	75	25	0	0	0	0	75	25	0
O075	*Hydroptila arctia*	TRI	HOP	6	108	0	0	0	0	0	75	25	0	0	0	0	75	25	0
O077	*Hydroptila argosa*	TRI	HOP	6	108	0	0	0	0	0	75	25	0	0	0	0	75	25	0
O080	*Hydroptila callia*	TRI	HOP	6	108	0	0	0	0	0	75	25	0	0	0	0	75	25	0
O082	*Hydroptila consimilis*	TRI	HOP	6	108	0	0	0	0	0	75	25	0	0	0	0	75	25	0
O085	*Hydroptila hamata*	TRI	HOP	6	108	0	0	0	0	0	75	25	0	0	0	0	75	25	0
O087	*Hydroptila icona*	TRI	HOP	6	108	0	0	0	0	0	75	25	0	0	0	0	75	25	0
O090	*Hydroptila lenora*	TRI	HOP	6	108	0	0	0	0	0	75	25	0	0	0	0	75	25	0
O092	*Hydroptila modica*	TRI	HOP	6	108	0	0	0	0	0	75	25	0	0	0	0	75	25	0
O095	*Hydroptila pecos*	TRI	HOP	6	108	0	0	0	0	0	75	25	0	0	0	0	75	25	0
O097	*Hydroptila pullatus*	TRI	HOP	6	108	0	0	0	0	0	75	25	0	0	0	0	75	25	0
O100	*Hydroptila rono*	TRI	HOP	6	108	0	0	0	0	0	75	25	0	0	0	0	75	25	0
O105	*Hydroptila xera*	TRI	HOP	6	108	0	0	0	0	0	75	25	0	0	0	0	75	25	0
O120	*Ithytrichia*	TRI	HOP	6	108	0	0	0	0	0	0	100	0	0	0	0	75	25	0
O125	*Ithytrichia clavata*	TRI	HOP	6	108	0	0	0	0	0	0	100	0	0	0	0	75	25	0
O130	*Ithytrichia mazon*	TRI	HOP	6	108	0	0	0	0	0	0	100	0	0	0	0	75	25	0
O150	*Leucotrichia*	TRI	HOP	6	108	0	0	25	0	0	0	75	0	0	0	0	75	25	0
O155	*Leucotrichia limpia*	TRI	HOP	6	108	0	0	25	0	0	0	75	0	0	0	0	75	25	0
O160	*Leucotrichia pictipes*	TRI	HOP	2	108	0	0	25	0	0	0	75	0	0	0	0	75	25	0
O165	*Leucotrichia sarita*	TRI	HOP	6	108	0	0	25	0	0	0	75	0	0	0	0	75	25	0
O180	*Mayatrichia*	TRI	HOP	6	108	0	0	0	0	0	0	100	0	0	0	0	75	25	0
O182	*Mayatrichia acuna*	TRI	HOP	6	108	0	0	0	0	0	0	100	0	0	0	0	75	25	0
O185	*Mayatrichia ayama*	TRI	HOP	6	108	0	0	0	0	0	0	100	0	0	0	0	75	25	0
O187	*Mayatrichia moselyi*	TRI	HOP	6	108	0	0	0	0	0	0	100	0	0	0	0	75	25	0
O190	*Mayatrichia ponta*	TRI	HOP	6	108	0	0	0	0	0	0	100	0	0	0	0	75	25	0
O200	*Metrichia*	TRI	HOP	4	108	0	0	0	0	0	0	100	0	0	0	0	75	25	0
O202	*Metrichia arizonensis*	TRI	HOP	4	108	0	0	0	0	0	0	100	0	0	0	0	75	25	0
O205	*Metrichia nigritta*	TRI	HOP	4	108	0	0	0	0	0	0	100	0	0	0	0	75	25	0
O207	*Metrichia volada*	TRI	HOP	4	108	0	0	0	0	0	0	100	0	0	0	0	75	25	0
O220	*Neotrichia*	TRI	HOP	4	108	0	0	0	0	0	0	100	0	0	0	0	75	25	0
O222	*Neotrichia caxima*	TRI	HOP	4	108	0	0	0	0	0	0	100	0	0	0	0	75	25	0
O225	*Neotrichia edalis*	TRI	HOP	4	108	0	0	0	0	0	0	100	0	0	0	0	75	25	0
O227	*Neotrichia erstis*	TRI	HOP	4	108	0	0	0	0	0	0	100	0	0	0	0	75	25	0
O230	*Neotrichia halia*	TRI	HOP	4	108	0	0	0	0	0	0	100	0	0	0	0	75	25	0
O232	*Neotrichia okapa*	TRI	HOP	4	108	0	0	0	0	0	0	100	0	0	0	0	75	25	0
O235	*Neotrichia osmena*	TRI	HOP	4	108	0	0	0	0	0	0	100	0	0	0	0	75	25	0
O237	*Neotrichia sonora*	TRI	HOP	4	108	0	0	0	0	0	0	100	0	0	0	0	75	25	0
O250	*Ochrotrichia*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O252	*Ochrotrichia alexanderi*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O254	*Ochrotrichia alsea*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O256	*Ochrotrichia argentea*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O258	*Ochrotrichia arizonica*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O260	*Ochrotrichia buccata*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O262	*Ochrotrichia dactylophora*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O264	*Ochrotrichia hadria*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O266	*Ochrotrichia honeyi*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O268	*Ochrotrichia ildria*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O270	*Ochrotrichia logana*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O272	*Ochrotrichia lometa*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O274	*Ochrotrichia lucia*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O276	*Ochrotrichia mono*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O278	*Ochrotrichia nacora*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
O280	*Ochrotrichia okanaganesis*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O282	*Ochrotrichia oregona*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O284	*Ochrotrichia phenosa*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O286	*Ochrotrichia potomus*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O288	*Ochrotrichia quadrispina*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O290	*Ochrotrichia rothi*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O291	*Ochrotrichia salaris*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O292	*Ochrotrichia spinulata*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O293	*Ochrotrichia stylata*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O294	*Ochrotrichia susanae*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O295	*Ochrotrichia tenuata*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O296	*Ochrotrichia trapoiza*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O297	*Ochrotrichia vertreesi*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O298	*Ochrotrichia zioni*	TRI	HOP	4	108	0	0	50	0	0	50	0	0	0	0	0	75	25	0
O300	*Orthotrichia*	TRI	HOP	6	108	0	0	0	0	0	100	0	0	0	0	0	75	25	0
O305	*Orthotrichia cristata*	TRI	HOP	6	108	0	0	0	0	0	100	0	0	0	0	0	75	25	0
O310	*Oxyethira*	TRI	HOP	3	108	0	0	25	0	0	75	0	0	0	0	0	75	25	0
O312	*Oxyethira aculea*	TRI	HOP	3	108	0	0	25	0	0	75	0	0	0	0	0	75	25	0
O314	*Oxyethira aeola*	TRI	HOP	3	108	0	0	25	0	0	75	0	0	0	0	0	75	25	0
O316	*Oxyethira araya*	TRI	HOP	3	108	0	0	25	0	0	75	0	0	0	0	0	75	25	0
O318	*Oxyethira arizona*	TRI	HOP	3	108	0	0	25	0	0	75	0	0	0	0	0	75	25	0
O320	*Oxyethira azteca*	TRI	HOP	3	108	0	0	25	0	0	75	0	0	0	0	0	75	25	0
O322	*Oxyethira dualis*	TRI	HOP	3	108	0	0	25	0	0	75	0	0	0	0	0	75	25	0
O324	*Oxyethira michiganensis*	TRI	HOP	3	108	0	0	25	0	0	75	0	0	0	0	0	75	25	0
O326	*Oxyethira pallida*	TRI	HOP	3	108	0	0	25	0	0	75	0	0	0	0	0	75	25	0
O328	*Oxyethira serrata*	TRI	HOP	3	108	0	0	25	0	0	75	0	0	0	0	0	75	25	0
O350	*Palaeagapetus*	TRI	HOP	0	108	0	0	0	0	100	0	0	0	0	0	0	75	25	0
O352	*Palaeagapetus guppyi*	TRI	HOP	0	108	0	0	0	0	100	0	0	0	0	0	0	75	25	0
O355	*Palaeagapetus nearcticus*	TRI	HOP	0	108	0	0	0	0	100	0	0	0	0	0	0	75	25	0
O370	*Rioptila arizonensis*	TRI	HOP	4	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
O380	*Stactobiella*	TRI	HOP	4	108	0	0	0	0	100	0	0	0	0	0	0	75	25	0
O381	*Stactobiella brustia*	TRI	HOP	4	108	0	0	0	0	100	0	0	0	0	0	0	75	25	0
O382	*Stactobiella delira*	TRI	HOP	4	108	0	0	0	0	100	0	0	0	0	0	0	75	25	0
O383	*Stactobiella palmata*	TRI	HOP	4	108	0	0	0	0	100	0	0	0	0	0	0	75	25	0
O390	*Zumatrichia*	TRI	HOP	4	108	0	0	25	0	0	0	75	0	0	0	0	75	25	0
O391	*Zumatrichia notosa*	TRI	HOP	4	108	0	0	25	0	0	0	75	0	0	0	0	75	25	0
O400	Lepidostomatidae	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O420	*Lepidostoma*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O421	*Lepidostoma acarolum*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O422	*Lepidostoma apornum*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O423	*Lepidostoma astaneum*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O424	*Lepidostoma bakeri*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O425	*Lepidostoma baxea*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O426	*Lepidostoma canthum*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O427	*Lepidostoma cascadense*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O428	*Lepidostoma cinereum*	TRI	LPI	2	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O429	*Lepidostoma deceptivum*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O430	*Lepidostoma ermanae*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O431	*Lepidostoma errigenum*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O432	*Lepidostoma hoodi*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O433	*Lepidostoma jewetti*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O434	*Lepidostoma knulli*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O435	*Lepidostoma lacinatum*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O436	*Lepidostoma licolum*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O437	*Lepidostoma lotor*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O438	*Lepidostoma mexicanum*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O439	*Lepidostoma ormeum*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O440	*Lepidostoma pluviale*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O441	*Lepidostoma podager*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O442	*Lepidostoma quercinum*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O443	*Lepidostoma rayneri*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O444	*Lepidostoma recinum*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O445	*Lepidostoma roafi*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O446	*Lepidostoma spicatum*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O447	*Lepidostoma stigma*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O448	*Lepidostoma togatum*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O449	*Lepidostoma unicolor*	TRI	LPI	2	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O450	*Lepidostoma verodum*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
O480	*Lepidostoma-panel case larvae*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O482	*Lepidostoma-sand case larvae*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O484	*Lepidostoma-spiral case larvae*	TRI	LPI	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O485	*Lepidostoma-turret case larvae*	TRI	LPI	2	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O500	Leptoceridae	TRI	LPT	4	54	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O530	*Ceraclea*	TRI	LPT	3	54	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O535	*Ceraclea annulicornis*	TRI	LPT	3	54	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O540	*Ceraclea cancellata*	TRI	LPT	3	54	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O580	*Mystacides*	TRI	LPT	4	54	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O585	*Mystacides alafimbriata*	TRI	LPT	4	54	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O600	*Nectopsyche*	TRI	LPT	3	54	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O630	*Oecetis*	TRI	LPT	8	54	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O635	*Oecetis inconspicua*	TRI	LPT	8	54	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O660	*Triaenodes*	TRI	LPT	6	54	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O670	*Triaenodes tarda*	TRI	LPT	6	54	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O700	Limnephilidae	TRI	LIM	4	108	0	0	0	0	0	0	0	0	0	0	100	0	100	0
O705	*Allocosmoecus partitus*	TRI	LIM	0	18	0	0	0	0	0	0	100	0	0	0	0	0	100	0
O710	*Amphicosmoecus canax*	TRI	LIM	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O715	*Anabolia*	TRI	LIM	5	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O716	*Anabolia bimaculata*	TRI	LIM	5	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O717	*Anabolia consocia*	TRI	LIM	5	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O718	*Anabolia shoshone*	TRI	LIM	5	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O725	*Arctopora*	TRI	LIM	4	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O730	*Apatania*	TRI	LIM	1	18	0	0	0	0	0	0	100	0	0	0	0	0	100	0
O735	*Apatania sorex*	TRI	LIM	1	18	0	0	0	0	0	0	100	0	0	0	0	0	100	0
O736	*Apatania tavala*	TRI	LIM	0	18	0	0	0	0	0	0	100	0	0	0	0	0	0	100
O737	*Apatania zonella*	TRI	LIM	0	18	0	0	0	0	0	0	100	0	0	0	0	0	100	0
O740	*Asynarchus*	TRI	LIM	4	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O741	*Asynarchus aldinus*	TRI	LIM	4	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O742	*Asynarchus cinnamoneus*	TRI	LIM	4	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O743	*Asynarchus curtus*	TRI	LIM	4	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O744	*Asynarchus iteratus*	TRI	LIM	4	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O745	*Asynarchus lapponicus*	TRI	LIM	4	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O746	*Asynarchus montanus*	TRI	LIM	6	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O747	*Asynarchus mutatus*	TRI	LIM	4	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O748	*Asynarchus nigriculus*	TRI	LIM	4	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O749	*Asynarchus pacificus*	TRI	LIM	4	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O760	*Chyranda centralis*	TRI	LIM	1	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O765	*Clistoronia*	TRI	LIM	4	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O766	*Clistoronia flavicollis*	TRI	LIM	4	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O767	*Clistoronia formosa*	TRI	LIM	4	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O768	*Clistoronia magnifica*	TRI	LIM	4	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O769	*Clistoronia n.sp.*	TRI	LIM	4	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O775	*Clostoeca disjuncta*	TRI	LIM	4	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O780	*Cryptochia*	TRI	LIM	0	108	0	0	0	0	0	0	0	50	50	0	0	0	0	100
O781	*Crytochia neosa*	TRI	LIM	0	108	0	0	0	0	0	0	0	50	50	0	0	0	0	100
O782	*Cryptochia pilosa*	TRI	LIM	0	108	0	0	0	0	0	0	0	50	50	0	0	0	0	100
O790	*Desmona bethula*	TRI	LIM	1	108	0	0	0	0	50	0	0	50	0	0	0	0	0	100
O791	*Desmona mono*	TRI	LIM	1	108	0	0	0	0	50	0	0	50	0	0	0	0	0	100
O795	*Dicosmoecinae*	TRI	LIM	1	108	0	0	0	0	0	0	0	0	0	0	100	0	100	0
O797	*Dicosmoecus*	TRI	LIM	1	24	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O798	*Dicosmoecus atripes*	TRI	LIM	1	24	0	0	0	0	0	0	0	0	0	100	0	0	0	100
O799	*Dicosmoecus gilvipes*	TRI	LIM	2	24	0	0	0	0	0	0	90	10	0	0	0	0	50	50
O802	*Ecclisocosmoecus scylla*	TRI	LIM	0	108	0	0	0	0	0	0	0	100	0	0	0	0	50	50
O805	*Ecclisomyia*	TRI	LIM	2	108	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O806	*Ecclisomyia conspersa*	TRI	LIM	1	108	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O807	*Ecclisomyia maculata*	TRI	LIM	1	108	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O810	*Eocosmoecus frontalis*	TRI	LIM	0	108	0	0	0	0	0	0	0	0	0	100	0	0	0	100
O811	*Eocosmoecus schmidi*	TRI	LIM	0	108	0	0	0	0	0	0	0	0	0	100	0	0	0	100
O815	*Glyphopsyche irrorata*	TRI	LIM	1	108	0	0	0	0	0	100	0	0	0	0	0	0	100	0
O820	*Grammotaulius*	TRI	LIM	4	108	0	0	0	0	0	100	0	0	0	0	0	0	100	0
O822	*Grammotaulius betteni*	TRI	LIM	4	108	0	0	0	0	0	100	0	0	0	0	0	0	100	0
O825	*Halesochila taylori*	TRI	LIM	1	108	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O830	*Hesperophylax*	TRI	LIM	3	108	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O845	*Homophylax*	TRI	LIM	0	18	0	0	0	0	0	0	0	100	0	0	0	0	0	100
O846	*Homophylax acutus*	TRI	LIM	0	18	0	0	0	0	0	0	0	100	0	0	0	0	0	100
O847	*Homophylax adriana*	TRI	LIM	0	18	0	0	0	0	0	0	0	100	0	0	0	0	0	100
O848	*Homophylax andax*	TRI	LIM	0	18	0	0	0	0	0	0	0	100	0	0	0	0	0	100
O849	*Homophylax auricularis*	TRI	LIM	0	18	0	0	0	0	0	0	0	100	0	0	0	0	0	100

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
O850	*Homophylax baldur*	TRI	LIM	0	18	0	0	0	0	0	0	0	100	0	0	0	0	0	100
O851	*Homophylax flavipennis*	TRI	LIM	0	18	0	0	0	0	0	0	0	100	0	0	0	0	0	100
O852	*Homophylax insulas*	TRI	LIM	0	18	0	0	0	0	0	0	0	100	0	0	0	0	0	100
O853	*Homophylax nevadensis*	TRI	LIM	0	18	0	0	0	0	0	0	0	100	0	0	0	0	0	100
O854	*Homophylax rentzi*	TRI	LIM	0	18	0	0	0	0	0	0	0	100	0	0	0	0	0	100
O860	*Hydatophylax hesperus*	TRI	LIM	1	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O865	*Imania*	TRI	LIM	0	48	0	0	0	0	0	0	100	0	0	0	0	0	0	100
O870	*Lenarchus*	TRI	LIM	3	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O871	*Lenarchus brevipennis*	TRI	LIM	3	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O872	*Lenarchus crassus*	TRI	LIM	3	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O873	*Lenarchus expansus*	TRI	LIM	3	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O874	*Lenarchus fautini*	TRI	LIM	3	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O875	*Lenarchus gravidus*	TRI	LIM	3	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O876	*Lenarchus rho*	TRI	LIM	3	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O877	*Lenarchus rillus*	TRI	LIM	3	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O878	*Lenarchus vastus*	TRI	LIM	3	18	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O885	*Limnephilus*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O886	*Limnephilus alconura*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O887	*Limnephilus aretto*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O888	*Limnephilus atercus*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O889	*Limnephilus canadensis*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O890	*Limnephilus catula*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O891	*Limnephilus cerus*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O892	*Limnephilus ectus*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O893	*Limnephilus externus*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O894	*Limnephilus fagus*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O895	*Limnephilus Fenestratus Gr.*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O896	*Limenphilus frijole*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O897	*Limnephilus harrimani*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O898	*Limnephilus hyalinatus*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O899	*Limnephilus insularis*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O900	*Limnephilus kalama*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O901	*Limnephilus kennecotti*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O902	*Limnephilus lopho*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O903	*Limnephilus lunonus*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O904	*Limnephilus morrisoni*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O905	*Limnephilus nogus*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O906	*Limnephilus occidentalis*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O907	*Limnephilus productus*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O908	*Limnephilus santanus*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O909	*Limnephilus secludens*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O910	*Limnephilus sericeus*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O911	*Limnephilus sitchensis*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O912	*Limnephilus spinatus*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O913	*Limnephilus sylviae*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O915	*Manophylax annulatus*	TRI	LIM	11	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
O917	*Moselyana comosa*	TRI	LIM	0	108	0	0	0	0	0	0	0	0	0	0	100	0	0	100
O920	*Nemotaulius hostilis*	TRI	LIM	3	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O922	*Onocosmoecus*	TRI	LIM	1	18	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O923	*Onocosmoecus unicolor*	TRI	LIM	1	18	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O925	*Pedomoecus sierra*	TRI	LIM	0	108	0	0	0	0	0	0	100	0	0	0	0	0	0	100
O927	*Phanocelia*	TRI	LIM	11	108	0	0	0	0	0	0	0	0	0	0	100	0	100	0
O930	*Philarctus quaeris*	TRI	LIM	11	108	0	0	0	0	0	0	0	0	0	0	100	0	100	0
O932	*Philocasca*	TRI	LIM	0	108	0	0	0	0	0	0	0	100	0	0	0	0	0	100
O933	*Philocasca demita*	TRI	LIM	0	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O934	*Philocasca oron*	TRI	LIM	0	108	0	0	0	0	0	0	0	100	0	0	0	0	0	100
O935	*Philocasca rivularis*	TRI	LIM	0	108	0	0	0	0	0	0	0	100	0	0	0	0	0	100
O937	*Platycentropus*	TRI	LIM	4	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O940	*Pseudostenophylax edwardsi*	TRI	LIM	1	108	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O942	*Psychoglypha*	TRI	LIM	0	24	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O943	*Psychoglypha n. sp.*	TRI	LIM	0	24	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O944	*Psychoglypha alascensis*	TRI	LIM	1	24	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O945	*Psychoglypha avigo*	TRI	LIM	1	24	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O946	*Psychoglypha bella*	TRI	LIM	2	24	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O947	*Psychoglypha browni*	TRI	LIM	0	24	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O948	*Psychoglypha klamathi*	TRI	LIM	0	24	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O949	*Psychoglypha leechi*	TRI	LIM	0	24	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O950	*Psychoglypha mazamae*	TRI	LIM	0	24	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O951	*Psychoglupha ormiae*	TRI	LIM	0	24	0	0	0	0	0	0	0	0	0	100	0	0	100	0

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
O952	*Psychoglypha prithus*	TRI	LIM	0	24	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O953	*Psychoglypha rossi*	TRI	LIM	0	24	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O954	*Psychoglypha schmidi*	TRI	LIM	0	24	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O955	*Psychoglypha schuhi*	TRI	LIM	0	24	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O956	*Psychoglypha smithi*	TRI	LIM	0	24	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O957	*Psychoglypha subborealis*	TRI	LIM	2	24	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O958	*Psychoglypha ullus*	TRI	LIM	0	24	0	0	0	0	0	0	0	0	0	100	0	0	100	0
O960	*Psychoronia*	TRI	LIM	11	108	0	0	0	0	0	0	0	0	0	0	100	0	100	0
O961	*Psychoronia costalis*	TRI	LIM	11	108	0	0	0	0	0	0	0	0	0	0	100	0	100	0
O965	*Pycnopsyche*	TRI	LIM	4	72	0	0	0	0	0	0	0	100	0	0	0	0	100	0
O970	*Rossiana montana*	TRI	LIM	11	108	0	0	0	0	0	0	0	0	0	0	100	0	100	0
P000	Molannidae	TRI	MOL	6	110	0	0	100	0	0	0	0	0	0	0	0	0	100	0
P020	*Molanna*	TRI	MOL	6	110	0	0	100	0	0	0	0	0	0	0	0	0	100	0
P050	*Molannodes*	TRI	MOL	6	110	0	0	100	0	0	0	0	0	0	0	0	0	100	0
P070	Odontoceridae	TRI	ODT	0	110	0	0	0	0	0	0	0	0	0	100	0	0	0	100
P080	*Marilia*	TRI	ODO	0	110	0	0	0	0	0	0	0	0	0	100	0	0	0	100
P090	*Namamyia plutonis*	TRI	ODO	0	110	0	0	0	0	0	0	0	0	0	100	0	0	0	100
P100	*Nerophilus californicus*	TRI	ODO	0	110	0	0	0	0	0	0	0	0	0	100	0	0	0	100
P110	*Parthina*	TRI	ODO	0	110	0	0	0	0	0	0	0	0	0	100	0	0	0	100
P115	*Parthina linea*	TRI	ODO	0	110	0	0	0	0	0	0	0	0	0	100	0	0	0	100
P130	Philopotamidae	TRI	PHI	3	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P140	*Chimarra*	TRI	PHI	4	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P143	*Chimarra adella*	TRI	PHI	4	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P145	*Chimarra angustipennis*	TRI	PHI	4	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P147	*Chimarra butleri*	TRI	PHI	4	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P150	*Chimarra elia*	TRI	PHI	4	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P153	*Chimarra lara*	TRI	PHI	4	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P155	*Chimarra primula*	TRI	PHI	4	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P157	*Chimarra schiza*	TRI	PHI	4	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P160	*Chimarra siva*	TRI	PHI	4	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P163	*Chimarra texana*	TRI	PHI	4	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P165	*Chimarra utahensis*	TRI	PHI	4	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P180	*Dolophilodes*	TRI	PHI	2	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P183	*Dolophilodes aequalis*	TRI	PHI	2	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P185	*Dolophilodes distinctus*	TRI	PHI	0	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P187	*Dolophilodes dorcus*	TRI	PHI	2	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P190	*Dolophilodes novusamericanus*	TRI	PHI	1	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P193	*Dolophilodes oregona*	TRI	PHI	1	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P195	*Dolophilodes pallidipes*	TRI	PHI	2	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P197	*Dolophilodes sisko*	TRI	PHI	1	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P220	*Wormaldia*	TRI	PHI	3	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P223	*Wormaldia anilla*	TRI	PHI	2	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P225	*Wormaldia arizonensis*	TRI	PHI	3	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P227	*Wormaldia gabriella*	TRI	PHI	3	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P230	*Wormaldia gesugta*	TRI	PHI	3	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P233	*Wormaldia hamata*	TRI	PHI	3	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P235	*Wormaldia lacerna*	TRI	PHI	3	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P237	*Wormaldia occidea*	TRI	PHI	1	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P240	*Wormaldia pachita*	TRI	PHI	3	24	0	0	0	100	0	0	0	0	0	0	0	0	100	0
P250	Phryganeidae	TRI	PHR	4	110	0	0	0	0	0	0	0	0	0	100	0	0	100	0
P260	*Agrypnia*	TRI	PHR	7	110	0	0	0	0	0	0	0	0	0	100	0	0	100	0
P262	*Agrypnia colorata*	TRI	PHR	7	110	0	0	0	0	0	0	0	0	0	100	0	0	100	0
P264	*Agrypnia deflata*	TRI	PHR	7	110	0	0	0	0	0	0	0	0	0	100	0	0	100	0
P266	*Agrypnia dextra*	TRI	PHR	7	110	0	0	0	0	0	0	0	0	0	100	0	0	100	0
P268	*Agrypnia glacialis*	TRI	PHR	7	110	0	0	0	0	0	0	0	0	0	100	0	0	100	0
P270	*Agrypnia improba*	TRI	PHR	7	110	0	0	0	0	0	0	0	0	0	100	0	0	100	0
P272	*Agrypnia macdunnoughi*	TRI	PHR	7	110	0	0	0	0	0	0	0	0	0	100	0	0	100	0
P274	*Agrypnia pagetana*	TRI	PHR	7	110	0	0	0	0	0	0	0	0	0	100	0	0	100	0
P276	*Agrypnia vestita*	TRI	PHR	7	110	0	0	0	0	0	0	0	0	0	100	0	0	100	0
P280	*Banksiola*	TRI	PHR	4	110	0	0	0	0	0	0	0	0	0	100	0	0	100	0
P285	*Banksiola crotchi*	TRI	PHR	4	110	0	0	0	0	0	0	0	0	0	100	0	0	100	0
P300	*Fabria*	TRI	PHR	4	110	0	0	0	0	0	0	0	0	0	100	0	0	100	0
P310	*Oligostomis*	TRI	PHR	2	110	0	0	0	0	0	0	0	0	0	100	0	0	100	0
P320	*Oligotricha*	TRI	PHR	4	110	0	0	0	0	0	0	0	0	0	100	0	0	100	0
P330	*Phryganea cinerea*	TRI	PHR	8	110	0	0	0	0	0	0	0	0	0	100	0	0	100	0
P340	*Ptilostomis*	TRI	PHR	5	110	0	0	0	0	0	0	0	0	0	100	0	0	100	0
P345	*Ptilostomis ocellifera*	TRI	PHR	5	110	0	0	0	0	0	0	0	0	0	100	0	0	100	0
P350	*Yphria californica*	TRI	PHR	1	110	0	0	0	0	0	0	0	0	0	100	0	0	100	0

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
P360	Polycentropodidae	TRI	PLY	6	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P370	*Cernotina*	TRI	PLY	6	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P380	*Cyrnellus*	TRI	PLY	8	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P385	*Cyrnellus fraternus*	TRI	PLY	8	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P390	*Neureclipsis*	TRI	PLY	7	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P393	*Neureclipsis bimaculata*	TRI	PLY	7	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P395	*Neureclipsis crepuscularis*	TRI	PLY	7	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P410	*Nyctiophylax*	TRI	PLY	5	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P415	*Nyctiophylax affinis*	TRI	PLY	5	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P420	*Nyctiophylax moestus*	TRI	PLY	5	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P430	*Phylocentropus*	TRI	PLY	5	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P440	*Plectrocnemia conspersa*	TRI	PLY	6	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P450	*Polycentropus*	TRI	PLY	6	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P452	*Polycentropus albipunctus*	TRI	PLY	6	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P454	*Polycentropus aureolus*	TRI	PLY	6	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P456	*Polycentropus cinereus*	TRI	PLY	6	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P458	*Polycentropus crassicornis*	TRI	PLY	6	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P460	*Polycentropus denningi*	TRI	PLY	2	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P462	*Polycentropus flavus*	TRI	PLY	6	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P464	*Polycentropus halidus*	TRI	PLY	6	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P466	*Polycentropus iculus*	TRI	PLY	6	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P468	*Polycentropus interruptus*	TRI	PLY	6	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P470	*Polycentropus jenula*	TRI	PLY	6	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P472	*Polycentropus picicornis*	TRI	PLY	6	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P474	*Polycentropus remotus*	TRI	PLY	6	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P476	*Polycentropus smithae*	TRI	PLY	6	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P478	*Polycentropus variegatus*	TRI	PLY	6	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P480	*Polycentropus weedi*	TRI	PLY	6	72	50	0	0	50	0	0	0	0	0	0	0	50	50	0
P500	Psychomyiidae	TRI	PSY	2	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P510	*Lype diversa*	TRI	PSY	2	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P520	*Psychomyia*	TRI	PSY	2	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P523	*Psychomyia flavida*	TRI	PSY	2	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P525	*Psychomyia lumina*	TRI	PSY	2	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P527	*Psychomyia nomada*	TRI	PSY	2	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P530	*Tinodes*	TRI	PSY	2	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P532	*Tinodes belisa*	TRI	PSY	2	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P534	*Tinodes cascadia*	TRI	PSY	2	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P536	*Tinodes consuetus*	TRI	PSY	2	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P538	*Tinodes gabriella*	TRI	PSY	2	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P540	*Tinodes parvula*	TRI	PSY	2	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P542	*Tinodes powelli*	TRI	PSY	2	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P544	*Tinodes provo*	TRI	PSY	2	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P546	*Tinodes schusteri*	TRI	PSY	2	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P548	*Tinodes sigodona*	TRI	PSY	2	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P550	*Tinodes siskiyou*	TRI	PSY	2	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P552	*Tinodes twila*	TRI	PSY	2	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P554	*Tinodes usilla*	TRI	PSY	2	108	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P560	Rhyacophilidae	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P570	*Atopsyche*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P580	*Himalopsyche phryganea*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P600	*Rhyacophila*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P602	*Rhyacophila Alberta Gr.*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P604	*Rhyacophila alberta*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P606	*Rhyacophila amabilis*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P608	*Rhyacophila arnaudi*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P610	*Rhyacophila Angelita Gr.*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P612	*Rhyacophila angelita*	TRI	RHY	2	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P614	*Rhyacophila arcella*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P616	*Rhyacophila ardala*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P618	*Rhyacophila autumnalis*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P620	*Rhyacophila belona*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P622	*Rhyacophila Betteni Gr.*	TRI	RHY	1	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P624	*Rhyacophila betteni*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P626	*Rhyacophila bifila*	TRI	RHY	2	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P628	*Rhyacophila blarina*	TRI	RHY	1	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P630	*Rhyacophial Brunnea Gr.*	TRI	RHY	1	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P632	*Rhyacophila brunnea*	TRI	RHY	1	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P634	*Rhyacophila chilsia*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
P636	*Rhyacophila colonus*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P638	*Rhyacophila Coloradensis Gr.*	TRI	RHY	2	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P640	*Rhyacophila coloradensis*	TRI	RHY	2	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P642	*Rhyacophila darbyi*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P644	*Rhyacophila ecosa*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P646	*Rhyacophila fenderi*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P648	*Rhyacophila gemona*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P650	*Rhyacophila glaciera*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P652	*Rhyacophila grandis*	TRI	RHY	1	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P654	*Rhyacophila harmstoni*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P656	*Rhyacophila Hyalinata Gr.*	TRI	RHY	1	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P658	*Rhyacophila hyalinata*	TRI	RHY	1	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P660	*Rhyacophila insularis*	TRI	RHY	2	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P662	*Rhyacophial Iranda Gr.*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P664	*Rhyacophila iranda*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P666	*Rhyacophila jenniferae*	TRI	RHY	2	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P668	*Rhyacophila jewetti*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P670	*Rhyacophila karila*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P672	*Rhyacophila kernada*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P674	*Rhyacophila kincaidi*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P676	*Rhyacophila leechi*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P678	*Rhyacophila lineata*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P680	*Rhyacophila lurella*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P682	*Rhyacophila malkini*	TRI	RHY	2	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P684	*Rhyacophila milnei*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P685	*Rhyacophila mosana*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P686	*Rhyacophila narvae*	TRI	RHY	1	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P688	*Rhyacophila neograndis*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P690	*Rhyacophila Nevadensis Gr.*	TRI	RHY	1	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P692	*Rhyacophila nevadensis*	TRI	RHY	1	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P694	*Rhyacophila newelli*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P696	*Rhyacophila norcuta*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P698	*Rhyacophila ophrys*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P700	*Rhyacophila oreia*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P702	*Rhyacophila oreta*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P704	*Rhyacophila pellisa*	TRI	RHY	1	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P706	*Rhyacophila perda*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P708	*Rhyacophila perplana*	TRI	RHY	1	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P710	*Rhyacophila pichaca*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P712	*Rhyacophila potteri*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P714	*Rhyacophila rickeri*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P716	*Rhyacophila robusta*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P718	*Rhyacophila Rotunda Gr.*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P720	*Rhyacophila rotunda*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P722	*Rhyacophila sequoia*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P724	*Rhyacophila Sibirica Gr.*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P726	*Rhyacophila sierra*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P728	*Rhyacophila siskiyou*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P730	*Rhyacophila spinata*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P732	*Rhyacophila tucula*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P734	*Rhyacophila tralala*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P736	*Rhyacophila unimaculata*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P738	*Rhyacophila unipunctata*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P740	*Rhyacophila vaccua*	TRI	RHY	1	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P742	*Rhyacophila nr. vaccua*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P744	*Rhyacophila vaefes*	TRI	RHY	1	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P746	*Rhyacophila Vagrita Gr.*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P748	*Rhyacophila vagrita*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P750	*Rhyacophila valuma*	TRI	RHY	1	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P752	*Rhyacophila vao*	TRI	RHY	1	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P754	*Rhyacophila vedra*	TRI	RHY	2	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P756	*Rhyacophila velora*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P758	*Rhyacophila vemna*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P760	*Rhyacophial verrula*	TRI	RHY	0	18	0	0	0	0	100	0	0	0	0	0	0	0	50	50
P762	*Rhyacophila vetina*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P764	*Rhyacophila viquaea*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P766	*Rhyacophila visor*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P768	*Rhyacophila vobara*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
P770	*Rhyacophila vocala*	TRI	RHY	1	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P772	*Rhyacophila Vofixa Gr.*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P774	*Rhyacophial vofixa*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P776	*Rhyacophila willametta*	TRI	RHY	0	18	100	0	0	0	0	0	0	0	0	0	0	0	50	50
P800	Sericostomatidae	TRI	SER	3	72	0	0	0	0	0	0	0	100	0	0	0	0	100	0
P810	*Agarodes*	TRI	SER	3	72	0	0	0	0	0	0	0	100	0	0	0	0	100	0
P820	*Fattigia*	TRI	SER	3	72	0	0	0	0	0	0	0	100	0	0	0	0	100	0
P830	*Gumaga*	TRI	SER	3	72	0	0	0	0	0	0	0	100	0	0	0	0	100	0
P840	Uenoidae	TRI	UEN	0	8	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P850	*Farula*	TRI	UEN	0	8	0	0	0	0	0	0	100	0	0	0	0	0	0	100
P852	*Farula davisi*	TRI	UEN	0	8	0	0	0	0	0	0	100	0	0	0	0	0	0	100
P854	*Farula honeyi*	TRI	UEN	0	8	0	0	0	0	0	0	100	0	0	0	0	0	0	100
P856	*Farula jewetti*	TRI	UEN	0	8	0	0	0	0	0	0	100	0	0	0	0	0	0	100
P858	*Farula malkini*	TRI	UEN	0	8	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P860	*Farula petersoni*	TRI	UEN	0	8	0	0	0	0	0	0	100	0	0	0	0	0	0	100
P862	*Rarula rainieri*	TRI	UEN	0	8	0	0	0	0	0	0	100	0	0	0	0	0	0	100
P864	*Farula reaperi*	TRI	UEN	0	8	0	0	0	0	0	0	100	0	0	0	0	0	0	100
P866	*Farula wigginsi*	TRI	UEN	0	8	0	0	0	0	0	0	100	0	0	0	0	0	0	100
P870	*Neophylax*	TRI	UEN	3	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P880	*Neophylax occidentis*	TRI	UEN	1	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P885	*Neophylax rickeri*	TRI	UEN	2	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P890	*Neophylax smithi*	TRI	UEN	3	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P895	*Neophylax splendens*	TRI	UEN	2	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P910	*Neothremma*	TRI	UEN	0	8	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P915	*Neothremma alicia*	TRI	UEN	0	8	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P917	*Neothremma andersoni*	TRI	UEN	0	8	0	0	0	0	0	0	100	0	0	0	0	0	25	75
P920	*Neothremma didactyla*	TRI	UEN	0	8	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P925	*Neothremma genella*	TRI	UEN	0	8	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P930	*Neothremma siskiyou*	TRI	UEN	0	8	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P940	*Oligophlebodes*	TRI	UEN	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P943	*Oligophlebodes ardis*	TRI	UEN	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P950	*Oligophlebodes minutus*	TRI	UEN	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P955	*Oligophlebodes mostbento*	TRI	UEN	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P960	*Oligophlebodes ruthae*	TRI	UEN	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P965	*Oligophlebodes sierra*	TRI	UEN	0	24	0	0	0	0	0	0	100	0	0	0	0	0	100	0
P980	*Sericostriata surdickae*	TRI	UEN	0	8	0	0	0	0	0	0	100	0	0	0	0	0	0	100
Q500	Lepidoptera	LEP	LEP	5	72	0	0	0	0	0	0	0	0	0	0	100	0	100	0
Q550	Pyralidae	LEP	PYR	5	72	0	0	0	0	0	0	0	0	0	0	100	0	100	0
Q600	*Petrophila*	LEP	PYR	5	72	0	0	0	0	0	0	100	0	0	0	0	0	100	0
R000	Coleoptera	COL	COL	11	110	0	0	0	0	0	0	0	0	0	0	100	0	100	0
R030	Amphizoidae	COL	APZ	1	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
R040	*Amphizoa*	COL	APZ	1	24	100	0	0	0	0	0	0	0	0	0	0	0	0	100
R050	Dryopidae	COL	DRY	5	110	0	0	0	0	0	0	0	100	0	0	0	0	0	100
R060	*Dryops*	COL	DRY	5	110	0	0	0	0	0	0	0	100	0	0	0	0	0	100
R070	*Helichus*	COL	DRY	5	110	0	0	0	0	0	0	0	100	0	0	0	0	0	100
R090	*Pelonomus*	COL	DRY	5	110	0	0	0	0	0	0	0	100	0	0	0	0	0	100
R200	Dytiscidae	COL	DYT	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
R210	Dytiscidae-larvae	COL	DYT	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
R230	*Acilius*	COL	DYT	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
R240	*Agabetus*	COL	DYT	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
R250	*Agabinus*	COL	DYT	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
R260	*Agabus*	COL	DYT	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
R270	*Anodocheilus*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R280	*Bidessonotus*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R290	*Brachyvatus*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R300	*Carrhydrus*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R310	*Celina*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R320	*Colymbetes*	COL	DYT	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
R340	*Copelatus*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R360	*Coptotomus*	COL	DYT	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
R380	*Cybister*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R390	*Deronectes*	COL	DYT	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
R420	*Derovatellus*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R430	*Desmopachria*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R450	*Dytiscus*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R490	*Eretes*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
R500	*Graphoderus*	COL	DYT	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
R520	*Haideoporus*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R530	*Hoperius*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R540	*Hydaticus*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R550	*Hydroporus*	COL	DYT	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
R750	*Hydrotrupes*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R760	*Hydrovatus*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R770	*Hygrotus*	COL	DYT	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
R830	*Illybius*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R850	*Laccodytes*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R855	*Laccophilus*	COL	DYT	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
R870	*Laccornis*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R880	*Liodessus*	COL	DYT	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
R890	*Lioporius*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R895	*Matus*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R900	*Megadytes*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R905	*Neobidessus*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R910	*Neoclypeodytes*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R920	*Neoporus*	COL	DYT	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
R925	*Neoscutopterus*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R930	*Oreodytes*	COL	DYT	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
R950	*Pachydrus*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R955	*Potamonectes*	COL	DYT	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
R965	*Rhantus*	COL	DYT	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
R980	*Sanfilippodytes*	COL	DYT	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
R990	*Thermonectes*	COL	DYT			100	0	0	0	0	0	0	0	0	0	0	0	0	100
R995	*Uvarus*	COL	DYT	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
S100	Elmidae	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S110	Elmidae-larvae	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S120	*Ampumixis dispar*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S130	*Ancyronyx*	COL	ELM	6	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S140	*Atractelmis*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S150	*Cleptelmis*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S160	*Cleptelmis ornata*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S170	*Dubiraphia*	COL	ELM	6	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S180	*Dubiraphia mimima*	COL	ELM	6	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S190	*Elsianus*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S200	*Gonielmis*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S210	*Heterelmis*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S220	*Heterlimnius*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S225	*Heterlimnius corpulentus*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S230	*Hexacylloepus*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S240	*Huleechius*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S250	*Lara avara*	COL	ELM	4	104	0	0	0	0	0	0	0	0	100	0	0	0	0	100
S260	*Macronychus*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S270	*Microcylloepus*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S290	*Narpus*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S295	*Narpus concolor*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S300	*Neocylloepus*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S310	*Neoelmis*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S320	*Optioservus*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S330	*Optioservus quadrimaculatus*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S335	*Optioservus seriatus*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S340	*Ordobrevia nubifera*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S350	*Oulimnius*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S360	*Phanocerus*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S370	*Promoresia*	COL	ELM	2	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S380	*Rhizelmis*	COL	ELM	2	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S390	*Stenelmis*	COL	ELM	5	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S440	*Zaitzevia*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S445	*Zaitzevia milleri*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S450	*Zaitzevia parvula*	COL	ELM	4	104	0	0	50	0	0	0	50	0	0	0	0	0	0	100
S500	Gyrinidae	COL	GYR	5	108	100	0	0	0	0	0	0	0	0	0	0	0	0	100
S505	*Dineutus*	COL	GYR	5	108	100	0	0	0	0	0	0	0	0	0	0	0	0	100
S525	*Gyretes*	COL	GYR	5	108	100	0	0	0	0	0	0	0	0	0	0	0	0	100
S535	*Gyrinus*	COL	GYR	5	108	100	0	0	0	0	0	0	0	0	0	0	0	0	100
S590	*Spanglerogyrus*	COL	GYR	5	108	100	0	0	0	0	0	0	0	0	0	0	0	0	100

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
S600	Haliplidae	COL	HAL	5	54	0	0	0	0	100	0	0	0	0	0	0	0	0	100
S605	*Ateraliplus*	COL	HAL	5	54	0	0	0	0	100	0	0	0	0	0	0	0	0	100
S610	*Brychius*	COL	HAL	5	54	0	0	0	0	100	0	0	0	0	0	0	0	0	100
S620	*Haliplus*	COL	HAL	5	54	0	0	0	0	100	0	0	0	0	0	0	0	0	100
S680	*Peltodytes*	COL	HAL	5	54	0	0	0	0	100	0	0	0	0	0	0	0	0	100
T000	Hydrophilidae	COL	HPH	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
T020	*Ametor*	COL	HPH	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
T030	*Anacaena*	COL	HPH	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
T040	*Berosus*	COL	HPH	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
T080	*Chaetarthria*	COL	HPH	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
T090	*Crenitis*	COL	HPH	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
T110	*Crenitulus*	COL	HPH	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
T120	*Cymbiodyta*	COL	HPH	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
T160	*Derallus*	COL	HPH	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
T170	*Dibolocelus*	COL	HPH	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
T180	*Enochrus*	COL	HPH	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
T220	*Epimetopus*	COL	HPH	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
T230	*Helobata*	COL	HPH	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
T240	*Helochares*	COL	HPH	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
T250	*Helocombus*	COL	HPH	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
T260	*Helophorus*	COL	HPH	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
T290	*Hydrobiomorpha*	COL	HPH	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
T300	*Hydrobius*	COL	HPH	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
T310	*Hydrochara*	COL	HPH	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
T330	*Hydrochus*	COL	HPH	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
T360	*Hydrophilus*	COL	HPH	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
T370	*Lacobius*	COL	HPH	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
T390	*Paracymus*	COL	HPH	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
T410	*Sperchopsis*	COL	HPH	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
T420	*Tropisternus*	COL	HPH	5	72	100	0	0	0	0	0	0	0	0	0	0	0	0	100
T600	*Limnichidae*	COL	LCH	11	110	0	0	100	0	0	0	0	0	0	0	0	0	0	100
T610	*Limnichus*	COL	LCH	11	110	0	0	100	0	0	0	0	0	0	0	0	0	0	100
T620	*Lutrochus*	COL	LCH	11	110	0	0	100	0	0	0	0	0	0	0	0	0	0	100
T630	*Physemus*	COL	LCH	11	110	0	0	100	0	0	0	0	0	0	0	0	0	0	100
T640	*Throscinus*	COL	LCH	11	110	0	0	100	0	0	0	0	0	0	0	0	0	0	100
T700	Psephenidae	COL	PSE	4	110	0	0	0	0	0	0	100	0	0	0	0	0	0	100
T710	*Acneus*	COL	PSE	4	110	0	0	0	0	0	0	100	0	0	0	0	0	0	100
T720	*Alabameubria*	COL	PSE	4	110	0	0	0	0	0	0	100	0	0	0	0	0	0	100
T730	*Dicranopselaphus*	COL	PSE	4	110	0	0	0	0	0	0	100	0	0	0	0	0	0	100
T740	*Ectopria*	COL	PSE	4	110	0	0	0	0	0	0	100	0	0	0	0	0	0	100
T750	*Eubrianax edwardsi*	COL	PSE	4	110	0	0	0	0	0	0	100	0	0	0	0	0	0	100
T760	*Psephenus*	COL	PSE	4	110	0	0	0	0	0	0	100	0	0	0	0	0	0	100
U000	Diptera	DIP	DIP	11	110	0	0	0	0	0	0	0	0	0	0	0	0	100	0
U100	Anisopodidae	DIP	ANS	8	110	0	0	0	0	0	0	0	0	0	0	100	0	100	0
U120	*Sylvicola*	DIP	ANS	8	110	0	0	0	0	0	0	0	0	0	0	100	0	100	0
U200	Athericidae	DIP	ATH	2	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
U210	*Atherix*	DIP	ATH	4	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
U220	*Atherix pachypus*	DIP	ATH	4	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
U250	Bibionidae	DIP	BIB	11	110	0	0	0	0	0	0	0	0	0	0	100	0	100	0
U300	Blephariceridae	DIP	BLE	0	2	0	0	0	0	0	0	100	0	0	0	0	0	100	0
U310	*Agathon*	DIP	BLE	0	2	0	0	0	0	0	0	100	0	0	0	0	0	100	0
U320	*Bibiocephala*	DIP	BLE	0	2	0	0	0	0	0	0	100	0	0	0	0	0	100	0
U330	*Blepharicera*	DIP	BLE	0	2	0	0	0	0	0	0	100	0	0	0	0	0	100	0
U350	*Dioptopsis*	DIP	BLE	0	2	0	0	0	0	0	0	100	0	0	0	0	0	100	0
U360	*Philorus*	DIP	BLE	0	2	0	0	0	0	0	0	100	0	0	0	0	0	100	0
U400	Brachycera	DIP	BCY	11	110	0	0	0	0	0	0	0	0	0	0	100	0	100	0
U410	Cecidomyiidae	DIP	CEC	11	110	0	0	0	0	0	0	0	0	0	0	100	0	100	0
U450	Ceratopogonidae	DIP	CER	6	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
U900	Chaoboridae	DIP	CHA	7	110	100	0	0	0	0	0	0	0	0	0	0	0	100	0
U910	*Chaoborus*	DIP	CHA	7	110	100	0	0	0	0	0	0	0	0	0	0	0	100	0
U930	*Corethrella*	DIP	CHA	7	110	100	0	0	0	0	0	0	0	0	0	0	0	100	0
U940	*Eucorethra*	DIP	CHA	7	110	100	0	0	0	0	0	0	0	0	0	0	0	100	0
U950	*Mochlonyx*	DIP	CHA	7	110	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V000	Culicidae	DIP	CUL	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
V010	*Aedes*	DIP	CUL	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
V100	*Anopheles*	DIP	CUL	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
V120	*Culex*	DIP	CUL	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
V160	*Culiseta*	DIP	CUL	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
V170	*Deinocerites*	DIP	CUL	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
V180	*Haemogogus*	DIP	CUL	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
V190	*Mansonia*	DIP	CUL	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
V200	*Orthopodomyia*	DIP	CUL	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
V210	*Psorophora*	DIP	CUL	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
V240	*Toxorhynchites*	DIP	CUL	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
V250	*Uranotaenia*	DIP	CUL	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
V260	*Wyeomyia*	DIP	CUL	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
V300	Deuterophlebiidae	DIP	DEU	0	4	0	0	0	0	0	0	100	0	0	0	0	0	100	0
V310	*Deuterophlebia*	DIP	DEU	0	4	0	0	0	0	0	0	100	0	0	0	0	0	100	0
V320	*Deuterophlebia inyoensis*	DIP	DEU	0	4	0	0	0	0	0	0	100	0	0	0	0	0	100	0
V350	Dolichopodidae	DIP	DOL	4	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V400	Dixidae	DIP	DIX	2	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
V410	*Dixa*	DIP	DIX	2	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
V460	*Dixella*	DIP	DIX	2	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
V480	*Meringodixa*	DIP	DIX	2	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
V500	Empididae	DIP	EMP	6	95	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V510	*Boreodromia*	EMP	EMP	6	95	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V520	*Ceratempis*	EMP	EMP	6	95	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V530	*Chelifera*	EMP	EMP	6	95	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V550	*Chelipoda*	EMP	EMP	6	95	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V560	*Clinocera*	EMP	EMP	6	95	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V590	*Dolichocephala*	EMP	EMP	6	95	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V600	*Heleodromia*	EMP	EMP	6	95	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V605	*Hemerodromia*	EMP	EMP	6	95	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V630	*Metachela*	EMP	EMP	6	95	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V635	*Neoplasta*	EMP	EMP	6	95	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V640	*Niphogenia*	EMP	EMP	6	95	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V645	*Oreothalia*	EMP	EMP	6	95	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V655	*Oreogeton*	EMP	EMP	6	95	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V665	*Phyllodromia*	EMP	EMP	6	95	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V670	*Proclinopyga*	EMP	EMP	6	95	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V680	*Rhamphomyia*	EMP	EMP	6	95	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V700	*Roederiodes*	EMP	EMP	6	95	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V710	*Stilpon*	EMP	EMP	6	95	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V720	*Thanategia*	EMP	EMP	6	95	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V730	*Wiedemannia*	EMP	EMP	6	95	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V750	Ephydridae	DIP	EDR	6	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
V850	Muscidae	DIP	MUS	6	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V860	*Limnophora*	DIP	MUS	6	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V900	Mycetophilidae	DIP	MYC	11	110	0	0	0	0	0	0	0	0	0	0	100	0	100	0
V950	Pelecorhynchidae	DIP	PEC	3	110	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V960	*Glutops*	DIP	PEC	3	110	100	0	0	0	0	0	0	0	0	0	0	0	100	0
V990	Phoridae	DIP	PHO	11	110	100	0	0	0	0	0	0	0	0	0	0	0	100	0
W000	Psychodidae	DIP	PSC	10	36	0	0	100	0	0	0	0	0	0	0	0	0	100	0
W030	*Maruina*	DIP	PSC	2	36	0	0	0	0	0	0	100	0	0	0	0	0	100	0
W040	*Pericoma*	DIP	PSC	4	36	0	0	100	0	0	0	0	0	0	0	0	0	100	0
W080	*Psychoda*	DIP	PSC	10	36	0	0	100	0	0	0	0	0	0	0	0	0	100	0
W120	*Telmatoscopus*	DIP	PSC	10	36	0	0	100	0	0	0	0	0	0	0	0	0	100	0
W150	Ptychopteridae	DIP	PTY	7	110	0	0	100	0	0	0	0	0	0	0	0	0	100	0
W160	*Bittacomorpha*	DIP	PTY	7	110	0	0	100	0	0	0	0	0	0	0	0	0	100	0
W170	*Bittacomorphella*	DIP	PTY	7	110	0	0	100	0	0	0	0	0	0	0	0	0	100	0
W180	*Ptychoptera*	DIP	PTY	7	110	0	0	100	0	0	0	0	0	0	0	0	0	100	0
W200	Scatopsidae	DIP	SCA	11	110	0	0	0	0	0	0	0	0	0	0	100	0	100	0
W250	Sciaridae	DIP	SCI	11	110	0	0	0	0	0	0	0	0	0	0	100	0	100	0
W300	Simuliidae	DIP	SIM	6	108	0	0	0	100	0	0	0	0	0	0	0	0	100	0
W310	*Cnephia*	DIP	SIM	6	108	0	0	0	100	0	0	0	0	0	0	0	0	100	0
W320	*Ectemnia*	DIP	SIM	6	108	0	0	0	100	0	0	0	0	0	0	0	0	100	0
W340	*Greniera*	DIP	SIM	6	108	0	0	0	100	0	0	0	0	0	0	0	0	100	0
W350	*Gymnopais*	DIP	SIM	6	108	0	0	0	100	0	0	0	0	0	0	0	0	100	0
W360	*Mayacnephia*	DIP	SIM	6	108	0	0	0	100	0	0	0	0	0	0	0	0	100	0
W370	*Metacephia*	DIP	SIM	6	108	0	0	0	100	0	0	0	0	0	0	0	0	100	0
W380	*Parasimulium*	DIP	SIM	6	108	0	0	0	100	0	0	0	0	0	0	0	0	100	0
W390	*Prosimulium*	DIP	SIM	3	108	0	0	0	100	0	0	0	0	0	0	0	0	100	0
W450	*Simulium*	DIP	SIM	6	108	0	0	0	100	0	0	0	0	0	0	0	0	100	0
W550	*Stegopterna*	DIP	SIM	6	108	0	0	0	100	0	0	0	0	0	0	0	0	100	0
W560	*Twinnia*	DIP	SIM	6	108	0	0	0	100	0	0	0	0	0	0	0	0	100	0

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
W600	Stratiomyiidae	DIP	STR	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
W610	*Beris*	DIP	STR	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
W620	*Caloparyphus*	DIP	STR	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
W640	*Euparyphus*	DIP	STR	5	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
W660	*Hedriodiscus*	DIP	STR	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
W675	*Nemotelus*	DIP	STR	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
W715	*Odontomyia*	DIP	STR	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
W760	*Oxycera*	DIP	STR	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
W775	*Sargus*	DIP	STR	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
W790	*Stratiomys*	DIP	STR	8	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
W850	Syrphidae	DIP	SYR	10	108	0	0	100	0	0	0	0	0	0	0	0	0	100	0
X100	Tabanidae	DIP	TAB	8	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
X110	*Apatolestes*	DIP	TAB	8	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
X130	*Atylotus*	DIP	TAB	8	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
X150	*Brennania*	DIP	TAB	8	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
X160	*Chlorotabanus*	DIP	TAB	8	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
X170	*Chrysops*	DIP	TAB	8	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
X300	*Haematopota*	DIP	TAB	8	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
X310	*Hybomitra*	DIP	TAB	8	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
X370	*Leucotabanus*	DIP	TAB	8	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
X380	*Merycomyia*	DIP	TAB	8	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
X390	*Silvius*	DIP	TAB	8	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
X400	*Stenotabanus*	DIP	TAB	8	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
X410	*Tabanus*	DIP	TAB	5	108	100	0	0	0	0	0	0	0	0	0	0	0	100	0
X500	Tanyderidae	DIP	TAN	1	110	0	0	0	0	0	0	0	0	0	0	100	0	100	0
X510	*Protanyderus*	DIP	TAN	1	110	0	0	0	0	0	0	0	0	0	0	100	0	100	0
X520	Thaumaleidae	DIP	THA	11	110	0	0	0	0	0	0	0	0	0	0	100	0	100	0
X550	Tipulidae	DIP	TIP	3	72	0	0	0	0	0	0	0	0	0	0	100	0	100	0
X560	*Antocha*	DIP	TIP	3	24	0	0	100	0	0	0	0	0	0	0	0	0	100	0
X570	*Arctoconopa*	DIP	TIP	3	72	0	0	0	0	0	0	0	0	0	0	100	0	100	0
X580	*Brachypremna*	DIP	TIP	3	72	0	0	0	0	0	0	0	0	0	0	100	0	100	0
X590	*Cryptolabis*	DIP	TIP	3	72	0	0	0	0	0	0	0	0	0	0	100	0	100	0
X600	*Dactylolabis*	DIP	TIP	3	72	0	0	0	0	0	0	0	0	0	0	100	0	100	0
X610	*Dicranota*	DIP	TIP	3	24	100	0	0	0	0	0	0	0	0	0	0	0	100	0
X620	*Elliptera*	DIP	TIP	3	72	0	0	0	0	0	0	0	0	0	0	100	0	100	0
X630	*Erioptera*	DIP	TIP	3	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
X640	*Gonomyia*	DIP	TIP	3	72	0	0	0	0	0	0	0	0	0	0	100	0	100	0
X650	*Gonomyodes*	DIP	TIP	3	72	0	0	0	0	0	0	0	0	0	0	100	0	100	0
X660	*Helius*	DIP	TIP	3	72	0	0	0	0	0	0	0	0	0	0	100	0	100	0
X670	*Hexatoma*	DIP	TIP	2	36	100	0	0	0	0	0	0	0	0	0	0	0	100	0
X680	*Hesperoconopa*	DIP	TIP	1	72	0	0	0	0	0	0	0	0	0	0	100	0	100	0
X690	*Holorusia*	DIP	TIP	5	72	0	0	0	0	0	0	0	100	0	0	0	0	100	0
X700	*Leptotarsus*	DIP	TIP	3	72	0	0	0	0	0	0	0	0	0	0	100	0	100	0
X710	*Limnophila*	DIP	TIP	3	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
X720	*Limonia*	DIP	TIP	6	72	0	0	0	0	100	0	0	0	0	0	0	0	100	0
X740	*Megistocera*	DIP	TIP	3	72	0	0	0	0	100	0	0	0	0	0	0	0	100	0
X750	*Molophilus*	DIP	TIP	3	72	0	0	0	0	0	0	0	0	0	0	100	0	100	0
X760	*Orimarga*	DIP	TIP	3	72	0	0	0	0	0	0	0	100	0	0	0	0	100	0
X770	*Ormosia*	DIP	TIP	3	72	0	0	100	0	0	0	0	0	0	0	0	0	100	0
X780	*Paradelphomyia*	DIP	TIP	3	72	0	0	0	0	0	0	0	0	0	0	100	0	100	0
X790	*Pedicia*	DIP	TIP	6	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
X800	*Phalacrocera*	DIP	TIP	3	72	0	0	0	0	100	0	0	0	0	0	0	0	100	0
X810	*Pilaria*	DIP	TIP	3	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
X820	*Polymera*	DIP	TIP	3	72	0	0	0	0	0	0	0	0	0	0	100	0	100	0
X830	*Prionocera*	DIP	TIP	3	72	0	0	0	0	0	0	0	0	0	0	100	0	100	0
X840	*Pseudolimnophila*	DIP	TIP	3	72	0	0	0	0	0	0	0	0	0	0	100	0	100	0
X850	*Rhabdomastix*	DIP	TIP	3	72	0	0	0	0	0	0	0	0	0	0	100	0	100	0
X860	*Thaumastoptera*	DIP	TIP	3	72	0	0	0	0	0	0	0	0	0	0	100	0	100	0
X870	*Tipula*	DIP	TIP	4	36	0	0	0	0	0	0	0	0	0	100	0	0	100	0
X880	*Triogma*	DIP	TIP	3	72	0	0	0	0	0	0	0	0	0	0	100	0	100	0
X890	*Ulomorpha*	DIP	TIP	3	72	100	0	0	0	0	0	0	0	0	0	0	0	100	0
Y000	Chironomidae	CHI	CHI	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Y001	Chironomidae-pupae	CHI	CHI	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Y002	Chironomidae-adult	CHI	CHI	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Y010	*Abiskomyia*	CHI	ORT	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y020	*Ablabesmyia*	CHI	TYP	8	108	50	0	50	0	0	0	0	0	0	0	0	75	25	0
Y030	*Acalcarella*	CHI	CIR	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
Y040	*Acamptocladius*	CHI	ORT	6	108	0	0	75	0	25	0	0	0	0	0	0	75	25	0
Y050	*Acricotopus*	CHI	ORT	10	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Y060	*Alotanypus*	CHI	TYP	6	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Y070	*Apsectrotanypus*	CHI	TYP	6	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Y080	*Apsectrotanypus algens*	CHI	TYP	6	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Y090	*Arctopelopia*	CHI	TYP	6	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Y100	*Axarus*	CHI	CIR	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y110	*Baeoctenus*	CHI	ORT	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Y120	*Beckidia*	CHI	CIR	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Y130	*Boreochlus*	CHI	POD	6	108	0	0	75	0	0	0	25	0	0	0	0	75	25	0
Y140	*Boreoheptagyia*	CHI	DIA	6	108	0	0	75	0	0	0	25	0	0	0	0	75	25	0
Y150	*Brillia*	CHI	ORT	5	108	0	0	25	0	0	0	0	50	25	0	0	75	25	0
Y160	*Brillia Flavifrons Gr.*	CHI	ORT	5	108	0	0	25	0	0	0	0	50	25	0	0	75	25	0
Y170	*Brillia Modesta Gr.*	CHI	ORT	5	108	0	0	25	0	0	0	0	50	25	0	0	75	25	0
Y180	*Brillia retifinis*	CHI	ORT	5	108	0	0	25	0	0	0	0	50	25	0	0	75	25	0
Y190	*Brundiniella*	CHI	TYP	6	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Y200	*Bryophaenocladius*	CHI	ORT	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Y210	*Camptocladius*	CHI	ORT	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Y220	*Cantopelopia*	CHI	TYP	6	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Y230	*Cardiocladius*	CHI	ORT	5	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Y240	*Chaetocladius*	CHI	ORT	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y250	*Chaetocladius Acuticornus Gr.*	CHI	ORT	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y260	*Chaetocladius Piger Gr.*	CHI	ORT	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y270	*Chasmatonotus*	CHI	ORT	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Y280	*Chernovskiia*	CHI	CIR	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Y290	Chironominae	CHI	CIR	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y300	Chironomini	CHI	CIR	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y310	*Chironomus*	CHI	CIR	10	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y320	*Chironomus Decorus Gr.*	CHI	CIR	10	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y330	*Cladopelma viridula*	CHI	CIR	9	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y340	*Cladotanytarsus*	CHI	TAR	7	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y350	*Cladotanytarsus Mancus Gr.*	CHI	TAR	7	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y360	*Clinotanypus*	CHI	TYP	8	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Y370	*Clunio*	CHI	ORT	6	108	0	0	75	0	0	0	25	0	0	0	0	75	25	0
Y380	*Coelotanypus*	CHI	TYP	4	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Y390	*Compteromesa*	CHI	PRO	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y400	*Conchapelopia*	CHI	TYP	6	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Y410	*Conchapelopia currani*	CHI	TYP	6	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Y420	*Conchapelopia dusena*	CHI	TYP	6	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Y430	*Constempellina*	CHI	TAR	4	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y440	*Corynocera*	CHI	TAR	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y450	*Corynoneura*	CHI	ORT	7	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y460	*Cricotopus*	CHI	ORT	7	108	0	0	50	0	50	0	0	0	0	0	0	75	25	0
Y470	*Cricotopus Bicinctus Gr.*	CHI	ORT	7	108	0	0	50	0	50	0	0	0	0	0	0	75	25	0
Y480	*Cricotopus bifurcatus*	CHI	ORT	7	108	0	0	50	0	50	0	0	0	0	0	0	75	25	0
Y490	*Cricotopus Festivellus Gr.*	CHI	ORT	7	108	0	0	50	0	50	0	0	0	0	0	0	75	25	0
Y500	*Cricotopus Fuscus Gr.*	CHI	ORT	7	108	0	0	50	0	50	0	0	0	0	0	0	75	25	0
Y510	*Cricotopus Isocladius*	CHI	ORT	7	108	0	0	50	0	50	0	0	0	0	0	0	75	25	0
Y520	*Cricotopus Nostococladius*	CHI	ORT	3	108	0	0	0	0	100	0	0	0	0	0	0	75	25	0
Y530	*Cricotopus Magnus Gr.*	CHI	ORT	7	108	0	0	50	0	50	0	0	0	0	0	0	75	25	0
Y540	*Cricotopus Sylvestris Gr.*	CHI	ORT	7	108	0	0	50	0	50	0	0	0	0	0	0	75	25	0
Y550	*Cricotopus Tibialis Gr.*	CHI	ORT	7	108	0	0	50	0	50	0	0	0	0	0	0	75	25	0
Y560	*Cricotopus Tremulus Gr.*	CHI	ORT	7	108	0	0	50	0	50	0	0	0	0	0	0	75	25	0
Y570	*Cricotopus Trifascia Gr.*	CHI	ORT	6	108	0	0	50	0	50	0	0	0	0	0	0	75	25	0
Y580	*Cryptochironomus*	CHI	CIR	8	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Y590	*Cryptotendipes*	CHI	CIR	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Y600	*Cyphomella*	CHI	CIR	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y610	*Demicryptochironomus*	CHI	CIR	8	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y620	*Diamesa*	CHI	DIA	5	108	0	0	75	0	0	0	25	0	0	0	0	75	25	0
Y630	Diamesinae	CHI	DIA	2	108	0	0	75	0	0	0	25	0	0	0	0	75	25	0
Y640	*Dicrotendipes*	CHI	CIR	8	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y650	*Dicrotendipes fumidus*	CHI	CIR	8	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y660	*Diplocladius*	CHI	ORT	8	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y670	*Djalmabatista*	CHI	TYP	3	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Y680	*Doithrix*	CHI	ORT	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Y690	*Doncricotopus*	CHI	ORT	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Y700	*Einfeldia*	CHI	CIR	9	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y710	*Endochironomus*	CHI	CIR	10	108	0	0	50	0	50	0	0	0	0	0	0	75	25	0
Y720	*Endochironomus nigricans*	CHI	CIR	10	108	0	0	50	0	50	0	0	0	0	0	0	75	25	0

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
Y730	*Epoicocladius*	CHI	ORT	4	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y740	*Eretmoptera*	CHI	ORT	6	108	0	0	0	0	0	0	100	0	0	0	0	75	25	0
Y750	*Eukiefferiella*	CHI	ORT	8	108	0	0	0	0	0	0	0	0	0	100	0	75	25	0
Y760	*Eukiefferiella Brehmi Gr.*	CHI	ORT	4	108	0	0	0	0	0	0	0	0	0	100	0	75	25	0
Y770	*Eukiefferiella Brevicalcar Gr.*	CHI	ORT	4	108	0	0	0	0	0	0	0	0	0	100	0	75	25	0
Y780	*Eukiefferiella Claripennis Gr.*	CHI	ORT	8	108	0	0	0	0	0	0	0	0	0	100	0	75	25	0
Y790	*Eukiefferiella Corulescens Gr.*	CHI	ORT	4	108	0	0	0	0	0	0	0	0	0	100	0	75	25	0
Y800	*Eukiefferiella Devonica Gr.*	CHI	ORT	4	108	0	0	0	0	0	0	0	0	0	100	0	75	25	0
Y810	*Eukiefferiella Gracei Gr.*	CHI	ORT	4	108	0	0	0	0	0	0	0	0	0	100	0	75	25	0
Y820	*Eukiefferiella Pseudomontana Gr.*	CHI	ORT	8	108	0	0	0	0	0	0	0	0	0	100	0	75	25	0
Y830	*Euryhapsis*	CHI	ORT	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Y840	*Georthocladius*	CHI	ORT	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Y850	*Gillotia*	CHI	CIR	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y860	*Glyptotendipes*	CHI	CIR	10	108	0	0	50	0	50	0	0	0	0	0	0	75	25	0
Y870	*Goeldichironomus*	CHI	CIR	8	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y880	*Graceus*	CHI	CIR	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Y890	*Guttipelopia*	CHI	TYP	5	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Y900	*Gymnometriocnemus*	CHI	ORT	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Y905	*Halocladius*	CHI	ORT	6	108	0	0	75	0	0	0	25	0	0	0	0	75	25	0
Y910	*Heleniella*	CHI	ORT	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Y915	*Helopelopia*	CHI	TYP	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Y920	*Heterotanytarsus*	CHI	ORT	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Y925	*Heterotrissocladius*	CHI	ORT	0	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y930	*Heterotrissocladius Marcidus Gr.*	CHI	ORT	0	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y935	*Heterotrissocladius Subpilosus Gr.*	CHI	ORT	0	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Y940	*Hudsonimyia*	CHI	TYP	2	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Y950	*Hydrobaenus*	CHI	ORT	8	108	0	0	50	0	0	0	50	0	0	0	0	75	25	0
Y960	*Hyporhygma*	CHI	CIR	6	108	0	0	0	0	100	0	0	0	0	0	0	75	25	0
Z000	*Kiefferulus*	CHI	CIR	10	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z005	*Krenopelopia*	CHI	TYP	6	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Z010	*Krenosmittia*	CHI	ORT	1	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z015	*Labrundinia*	CHI	TYP	7	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Z020	*Lapposmittia*	CHI	ORT	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z025	*Larsia*	CHI	TYP	6	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Z030	*Lasiodiamesa*	CHI	POD	6	108	0	0	75	0	0	0	25	0	0	0	0	75	25	0
Z035	*Lauterbornia*	CHI	TAR	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z040	*Lauterborniella*	CHI	CIR	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z045	*Lenziella*	CHI	TAR	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z050	*Limnophyes*	CHI	ORT	8	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z055	*Lopescladius*	CHI	ORT	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z060	*Macropelopia*	CHI	TYP	6	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Z065	Macropelopiini	CHI	TYP	6	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Z070	*Meropelopia*	CHI	TYP	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z075	*Meropelopia americana*	CHI	TYP	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z080	*Mesocricotopus*	CHI	ORT	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z085	*Metriocnemus*	CHI	ORT	6	108	25	0	75	0	0	0	0	0	0	0	0	75	25	0
Z090	*Microchironomus*	CHI	CIR	8	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z095	*Micropsectra*	CHI	TAR	7	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z100	*Microtendipes*	CHI	CIR	6	108	0	0	50	50	0	0	0	0	0	0	0	75	25	0
Z105	*Microtendipes pedellus var. stygiu*	CHI	CIR	6	108	0	0	50	50	0	0	0	0	0	0	0	75	25	0
Z110	*Monodiamesa*	CHI	PRO	7	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z115	*Monopelopia*	CHI	TYP	6	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Z120	*Nanocladius*	CHI	ORT	3	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z125	*Nanocladius distinctus*	CHI	ORT	3	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z130	*Natarsia*	CHI	TYP	8	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Z135	*Natarsia miripes*	CHI	TYP	8	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Z140	*Neozavrelia*	CHI	TAR	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z145	*Nilodorum*	CHI	CIR	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z150	*Nilotanypus*	CHI	TYP	6	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Z155	*Nilothauma*	CHI	CIR	2	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z160	*Nimbocera*	CHI	TAR	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z165	*Odontomesa*	CHI	PRO	4	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z170	*Oliveridea*	CHI	ORT	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z175	*Omisus*	CHI	CIR	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z180	*Oreadomyia*	CHI	ORT	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z185	Orthocladiinae	CHI	ORT	5	108	0	0	75	0	0	0	25	0	0	0	0	75	25	0
Z190	*Orthocladius Complex*	CHI	ORT	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z195	*Orthocladius*	CHI	ORT	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z200	*Orthocladius appersoni*	CHI	ORT	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
Z205	*Orthocladius dorenus*	CHI	ORT	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z210	*Orthocladius Eudactylocladius*	CHI	ORT	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z215	*Orthocladius Euorthocladius*	CHI	ORT	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z220	*Orthocladius Orthocladius*	CHI	ORT	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z225	*Orhtocladius Pogonocladius*	CHI	ORT	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z230	*Pagastia*	CHI	DIA	1	108	0	0	75	0	0	0	25	0	0	0	0	75	25	0
Z235	*Pagastiella*	CHI	CIR	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z240	*Paraboreochlus*	CHI	POD	6	108	0	0	75	0	0	0	25	0	0	0	0	75	25	0
Z245	*Parachaetocladius*	CHI	ORT	2	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z250	*Parachironomus*	CHI	CIR	10	108	50	25	25	0	0	0	0	0	0	0	0	75	25	0
Z255	*Parachironomus monochromus*	CHI	CIR	10	108	50	25	25	0	0	0	0	0	0	0	0	75	25	0
Z260	*Paracladius*	CHI	ORT	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z265	*Paracladopelma*	CHI	CIR	7	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z270	*Paracladopelma Camptolabis Gr.*	CHI	CIR	7	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z275	*Paraclunio*	CHI	TEL	6	108	0	0	0	0	0	0	100	0	0	0	0	75	25	0
Z280	*Paracricotopus*	CHI	ORT	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z285	*Parakiefferiella*	CHI	ORT	4	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z290	*Paralauterborniella*	CHI	CIR	8	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z295	*Paramerina*	CHI	TYP	6	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Z300	*Paramerina smithae*	CHI	TYP	6	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Z305	*Parametriocnemus*	CHI	ORT	5	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z310	*Parapelopia*	CHI	TYP	6	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Z315	*Paraphaenocladius*	CHI	ORT	4	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z320	*Paratanytarsus*	CHI	TAR	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z325	*Paratanytarsus Tenellulus Gr.*	CHI	TAR	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z330	*Paratendipes*	CHI	CIR	8	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z335	*Paratrichocladius*	CHI	ORT	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z340	*Parochlus*	CHI	POD	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z345	*Parorthocladius*	CHI	ORT	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z350	*Pedionomus*	CHI	CIR	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z355	*Pentaneurini*	CHI	TYP	6	108	0	0	0	0	0	0	0	0	0	0	0	75	25	0
Z360	*Pentaneura*	CHI	TYP	6	108	50	0	50	0	0	0	0	0	0	0	0	75	25	0
Z365	*Phaenopsectra*	CHI	CIR	7	108	0	0	25	25	0	0	50	0	0	0	0	75	25	0
Z370	*Podonominae*	CHI	POD	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z375	*Polypedilum*	CHI	CIR	6	108	0	0	0	0	0	0	0	0	0	100	0	75	25	0
Z380	*Polypedilum illinoense*	CHI	CIR	6	108	0	0	0	0	0	0	0	0	0	100	0	75	25	0
Z385	*Polypedilum Pentapedilum*	CHI	CIR	6	108	0	0	0	0	0	0	0	0	0	100	0	75	25	0
Z390	*Potthastia Gaedii Gr.*	CHI	DIA	2	108	0	0	75	0	0	0	25	0	0	0	0	75	25	0
Z395	*Potthastia Longimana Gr.*	CHI	DIA	2	108	0	0	75	0	0	0	25	0	0	0	0	75	25	0
Z400	*Procladius*	CHI	TYP	9	108	50	0	50	0	0	0	0	0	0	0	0	75	25	0
Z405	*Procladius bellus*	CHI	TYP	9	108	50	0	50	0	0	0	0	0	0	0	0	75	25	0
Z410	*Procladius freemani*	CHI	TYP	9	108	50	0	50	0	0	0	0	0	0	0	0	75	25	0
Z415	*Procladius sublettei*	CHI	TYP	9	108	50	0	50	0	0	0	0	0	0	0	0	75	25	0
Z420	*Prodiamesa*	CHI	PRO	3	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z425	Prodiamesinae	CHI	PRO	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z430	*Propsilocerus*	CHI	ORT	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z435	*Protanypus*	CHI	DIA	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z440	*Psectrocladius*	CHI	ORT	8	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z445	*Psectrocladius Allopsectrocladius*	CHI	ORT	8	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z450	*Psectrocladius Limbatellus Gr.*	CHI	ORT	8	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z455	*Psectrocladius Mesopsectrocladius*	CHI	ORT	8	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z460	*Psectrocladius Octomaculatus Gr.*	CHI	ORT	8	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z465	*Psectrocladius Sordidellus Gr.*	CHI	ORT	8	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z470	*Psectrotanypus*	CHI	TYP	10	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Z475	*Psectrotanypus dyari*	CHI	TYP	10	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Z480	*Pseudochironomus*	CHI	CIR	5	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z485	*Pseudochironomus richardsoni*	CHI	CIR	5	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z490	*Pseudodiamesa*	CHI	DIA	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z495	*Pseudokiefferiella*	CHI	DIA	1	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z500	*Pseudorthocladius*	CHI	ORT	0	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z505	*Pseudosmittia*	CHI	ORT	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z510	*Psilometriocnemus*	CHI	ORT	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z515	*Rheocricotopus*	CHI	ORT	6	108	0	0	0	0	0	0	0	0	0	100	0	75	25	0
Z520	*Rheocricotopus Effusus Gr.*	CHI	ORT	6	108	0	0	0	0	0	0	0	0	0	100	0	75	25	0
Z525	*Rheocricotopus Psilocricotopus*	CHI	ORT	6	108	0	0	0	0	0	0	0	0	0	100	0	75	25	0
Z530	*Rheopelopia*	CHI	TYP	4	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Z535	*Rheosmittia*	CHI	ORT	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z540	*Rheotanytarsus*	CHI	TAR	6	108	0	0	0	100	0	0	0	0	0	0	0	75	25	0
Z545	*Robackia*	CHI	CIR	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0

						Functional Feeding Groups											Voltinism		
CODE	TAXON	PRI	SEC	HBI	BCI	pr	pa	cg	cf	mh	ph	sc	sh	xy	om	un	Mv	Uv	Sv
Z550	*Saetheria*	CHI	CIR	4	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z555	*Smittia*	CHI	ORT	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z560	*Stempellina*	CHI	TAR	2	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z565	*Stempellinella*	CHI	TAR	4	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z570	*Stenochironomus*	CHI	CIR	5	108	0	0	75	0	0	0	0	0	25	0	0	75	25	0
Z575	*Stictochironomus*	CHI	CIR	9	108	0	0	75	0	25	0	0	0	0	0	0	75	25	0
Z580	*Stilocladius*	CHI	ORT	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z585	*Sublettea*	CHI	CIR	4	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z590	*Symbiocladius*	CHI	ORT	6	108	0	100	0	0	0	0	0	0	0	0	0	75	25	0
Z595	*Symposiocladius*	CHI	ORT	5	108	0	0	0	0	0	0	0	100	0	0	0	75	25	0
Z600	*Sympotthastia*	CHI	DIA	2	108	0	0	75	0	0	0	25	0	0	0	0	75	25	0
Z605	*Syndiamesa*	CHI	DIA	6	108	0	0	75	0	0	0	25	0	0	0	0	75	25	0
Z610	*Synorthocladius*	CHI	ORT	2	108	0	0	75	0	0	0	25	0	0	0	0	75	25	0
Z615	Tanypodinae	CHI	TYP	7	108	75	0	25	0	0	0	0	0	0	0	0	75	25	0
Z620	*Tanypus*	CHI	TYP	10	108	50	0	50	0	0	0	0	0	0	0	0	75	25	0
Z625	Tanytarsini	CHI	TAR	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z630	*Tanytarsus*	CHI	TAR	6	108	0	0	25	75	0	0	0	0	0	0	0	75	25	0
Z635	*Tanytarsus Brundini Gr.*	CHI	TAR	6	108	0	0	25	75	0	0	0	0	0	0	0	75	25	0
Z640	*Tanytarsus Eminulus Gr.*	CHI	TAR	6	108	0	0	25	75	0	0	0	0	0	0	0	75	25	0
Z645	*Tanytarsus Excavatus Gr.*	CHI	TAR	6	108	0	0	25	75	0	0	0	0	0	0	0	75	25	0
Z650	*Telopelopia*	CHI	TYP	8	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Z655	Telmatogetoninae	CHI	TEL	6	108	0	0	0	0	0	0	0	0	0	100	0	75	25	0
Z660	*Telmatogeton*	CHI	TEL	6	108	0	0	0	0	0	0	0	0	0	100	0	75	25	0
Z665	*Tethymyia*	CHI	ORT	6	108	0	0	0	0	0	0	100	0	0	0	0	75	25	0
Z670	*Thalassomya*	CHI	TEL	6	108	0	0	0	0	0	0	0	0	0	100	0	75	25	0
Z675	*Thalassosmittia*	CHI	ORT	6	108	0	0	0	0	0	0	0	0	0	100	0	75	25	0
Z680	*Thienemannia*	CHI	ORT	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z685	*Thienemanniella*	CHI	ORT	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z690	*Thienemannimyia*	CHI	TYP	6	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Z695	*Thienemanniola*	CHI	TAR	6	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z700	*Tokunagaia*	CHI	ORT	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z705	*Tribelos*	CHI	CIR	5	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z710	*Trichotanypus*	CHI	POD	6	108	0	0	75	0	0	0	25	0	0	0	0	75	25	0
Z715	*Trissocladius*	CHI	ORT	5	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z720	*Trissopelopia*	CHI	TYP	4	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Z725	*Tvetenia*	CHI	ORT	5	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z730	*Tvetenia Bavarica Gr.*	CHI	ORT	5	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z735	*Tvetenia Discoloripes Gr.*	CHI	ORT	5	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z740	*Wirthiella*	CHI	CIR	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z745	*Xenochironomus*	CHI	CIR	0	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Z750	*Xenopelopia*	CHI	TYP	6	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Z755	*Xylotopus*	CHI	ORT	2	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z760	*Zalutschia*	CHI	ORT	7	108	0	0	0	0	0	0	0	0	0	0	100	75	25	0
Z765	*Zavrelia*	CHI	TAR	6	108	0	0	100	0	0	0	0	0	0	0	0	75	25	0
Z770	*Zavrelimyia*	CHI	TYP	8	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0
Z775	*Zavrelimyia thryptica*	CHI	TYP	8	108	100	0	0	0	0	0	0	0	0	0	0	75	25	0